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STEEL

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FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

WEAN

GALVANIZING EQUIPMENT

produces a high yield of prime sheets at low cost.

A most rigid inspection under special lighting reveals the high quality of galvanized sheets produced on Wean equipment.

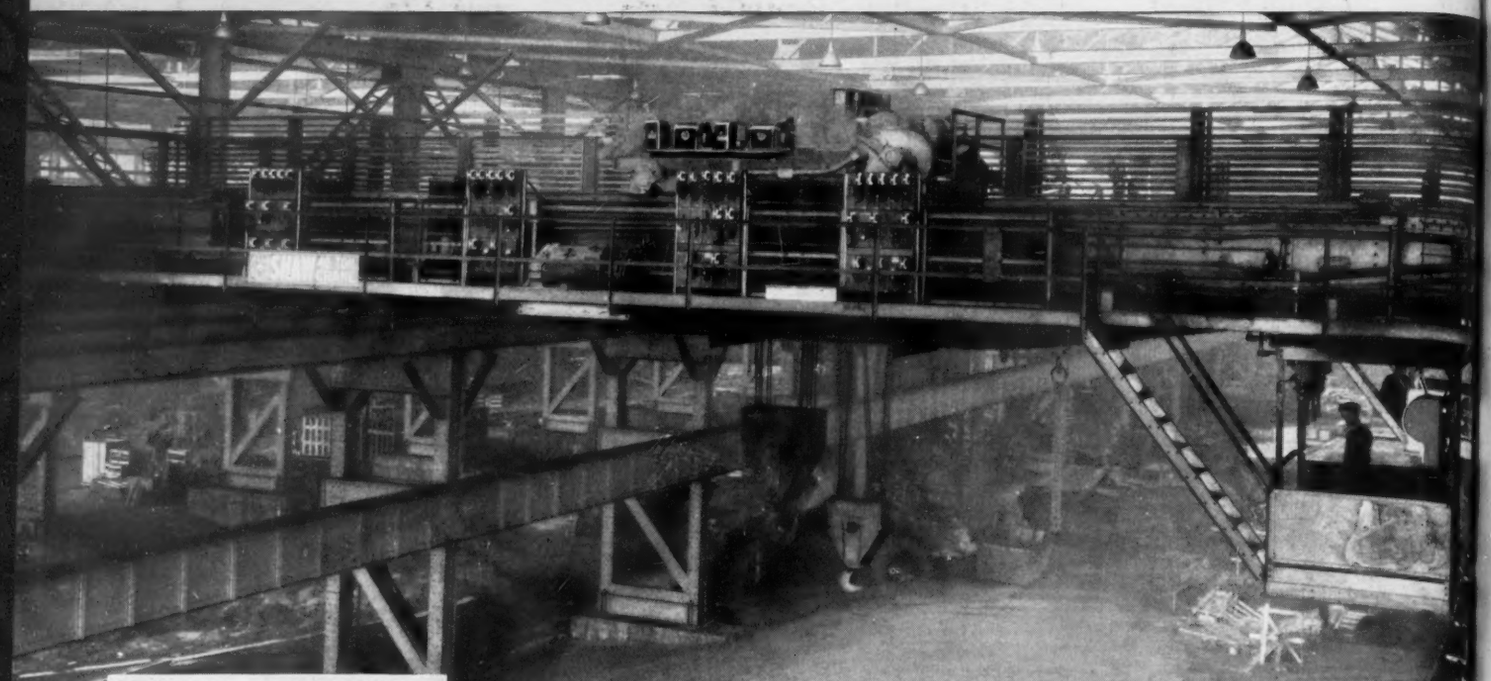
Photograph by courtesy of the Reeves Steel and Mfg. Co., Dover, O.

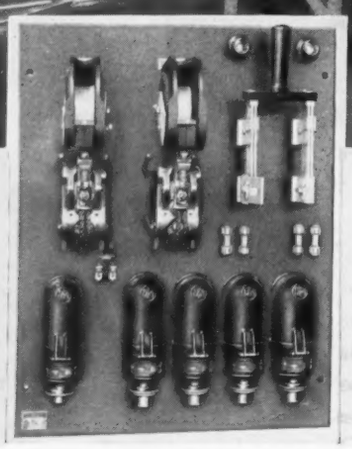
THE WEAN ENGINEERING CO., INC.
WARREN, OHIO

sociated Companies:

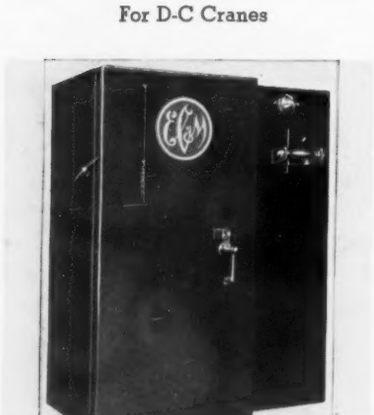
Lee Wilson Engineering Co.
The McKay Machine Co.
Flinn & Dreffein Co.
Wellman-Smith Owens Eng. Corp., Ltd.
The Hallden Machine Co.

EC&M CRANE PROTECTIO





For D-C Cranes



For A-C Cranes

A standardized unit for Protecting all Motors

In place of knife switches, fuses, circuit breakers, etc., which would otherwise be necessary, EC&M Crane Protective Panels incorporate all of these features in a single, compact unit requiring minimum space, which may be conveniently located in the rear of the crane cab. The Push Button which closes the Main Line Contactors (of LINE-ARC design) and makes the crane "live", may be self-contained on open type Panels as shown or when desired, mounted in the front of the cab, adjacent to the operator.

For Safety—Prevents Accidental Starts upon Failure of Power

These Panels not only provide individual protection for each motor, but automatically stop all motors upon power failure, preventing accidental starts upon return of power if the controllers have not been centered at the "off" position. They also permit emergency stopping of all motions on the crane by simply pushing the "stop" button.

And when it is desired to shut the crane down for repairs or adjustments, the knife switch on these panels may be padlocked in the "open" position, definitely preventing operation of the crane until all work has been completed and workmen have released the crane for duty again.

THE ELECTRIC CONTROLLER & MFG. CO. E&M CLEVELAND, OHIO

When buying Cranes, Specify **EC&M** *Contr*

Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Ordnance Experts Know Facts

To the Editor:

I believe that a most competent view of the preparedness situation could be given by the Army Ordnance association, Mills building, Washington.

One of the purposes of this association is to co-ordinate industrial activities in the case of an emergency of national character, and for that reason, no doubt, is aware of the detrimental influences which existing legislation might exert at a time when greatest efficiency will be demanded from industry.

W. HARNISCHFEGER

President,
Harnischfeger Corp.,
Milwaukee.

Machine Bogy Dies Hard

To the Editor:

Two articles on the same page of this week's issue of STEEL, (May 23, page 20), supplement each other remarkably. The chart by the National Industrial Conference board, showing that unemployment has decreased and industrial production has mounted, exactly supports the figures of the American Iron and Steel institute, showing that mechanization has not added to unemployment. That machinery does not reduce the number of workers has been proved so often and in so many ways it is a wonder the idea survives. It seems to have remarkable vitality.

It is too bad these facts cannot be carried to the man on the street, who never sees the class publications and gets his facts only from propaganda sources which tinge them with self-interest.

The coincidence that relief costs are highest when employment is at peak is a matter for a politician, not an industrialist, to explain. Perhaps more people are finding out about Santa Claus, or perhaps more are employed in disbursing the largess this running up the expense.

If this idea is of any value you may use it, but sign me as

READER

Cincinnati.

Abolish Questionnaire Evil

To the Editor:

It was with gratification I read in STEEL, May 23, page 34, that some action is to be taken by the President to reduce the flood of questionnaires that have been piling in from government departments and bureaus, seeking every sort of information on every conceivable subject.

The time and expense involved in answering these inquiries, when added to the tremendous number of tax returns to federal, state, county and municipality as well as special taxing bodies, is mounting each year until it is an intolerable burden.

I note that the President has allowed his head statistician until Jan. 1 to report his findings. That is a long time, it seems to me, but that some effort is under way is a hopeful sign. I believe the cost of these questionnaires is greater than most businessmen realize.

Perhaps the real method for curing this evil is to abolish a lot of governmental agencies. Perhaps the only way the employes of these bureaus can make themselves look busy is to send out inquiries and make up statistics from them.

MANUFACTURER

Buffalo

Tariff or No Tariff

To the Editor:

Great Britain, once the great exponent of free trade, pointed to by free trade advocates as the example for the United States to follow, has reversed her policy and now, in some commodities is so much higher than the United States that there is no comparison.

Reading in STEEL recently that a duty of 33 1/3 per cent had been reimposed on pig iron to stop imports from other countries I was reminded of the former position of the tight little island in letting the world ship in as much as it desired. In addition to this duty the consumer who agrees to buy all his supplies at home is given a rebate not allowed his less patriotic neighbor who patronizes foreigners. This makes practically a stone wall against imports of pig iron. Other iron and steel products are also well protected.

Without taking sides in the matter of tariffs, which apparently nobody really understands, this action by Great Britain seems to me a deterrent to world recovery. It imposes a barrier and tends to isolate and insulate that country from its neighbors. Perhaps conclusion of the trade treaty now under negotiation by Secretary of State Hull may change the picture. Yet there are arguments against admitting her to the most favored nations class for fear of her products entering this country at a low import rate to displace domestic material.

So they, and we, muddle along, seeking to better conditions and sometimes applying the right remedy and sometimes not.

PIG IRON MERCHANT

Chicago.

THEY USED TO TAP DANCE
• • • NOW IT'S "SOFT SHOE"

A typical example of Goodrich improvement in rubber

THESE are type bars of a typewriter, enlarged to fit the noise they make —that echoing rat-tat-tat in every office, as they go dancing against the roll or platen.

A large typewriter company thought there must be some way to reduce this noise, yet still retain their efficient system of swinging type bars. Goodrich, studying the rubber platen, tried to develop some practical way of cushioning the blows. A soft-rubber platen would be quiet but wouldn't make enough carbon copies. Could it have a softer cushion under a harder surface? How soft could the cushion be? How thick? How thick a layer of harder rubber?

Working on these problems, Goodrich technical men designed a platen that put more cushion under the typewriter "tap dancers" yet makes plenty of clean carbons. The new typewriters are quieter, offices are more comfortable to work in, yet efficiency hasn't been sacrificed.

There's hardly any type of industrial rubber product that isn't better today because of Goodrich development work. Modern Goodrich conveyor belts carry more tons than belts ever before; rubber hose resists abrasive wear, sunlight, oils, chemical actions of materials handled. Somewhere in your plant the extra quality resulting from Goodrich research can make a saving. Ask your Goodrich distributor. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL *products problems* IN RUBBER

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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

Contents

Vol. 102-No. 22 **May 30, 1938**

READER COMMENTS 7
AS THE EDITOR VIEWS THE NEWS 11
NEWS
- Release of Pent-up Capital Essential for Real Improvement, Says T. M. Girdler 13
- Report of American Iron and Steel Institute's Meeting 15
- Industry "Arraigned" at Metal Trades Meeting 18
- New Blooming Mill Started in Detroit 20
- Steelworks Operations for the Week 20
- Men of Industry 21
- Obituaries 22
- Business as Viewed by Purchasing Agents 23
- Labor News of the Steel Industry 24
- More "Daring" Design Needed To Hold World Markets for Machine Tools 25
- April Imports Up; Exports Decline 26

MIRRORS OF MOTORDOM 29
WINDOWS OF WASHINGTON 33
EDITORIAL—Public Relations Development Assumes First Place in Program of Business 35
THE BUSINESS TREND
- Industrial Activity Continues Sidewise Movement 36
- Charts and Statistics 36-37

TECHNICAL
- A Modern Milk Plant 38
- ASM Meeting at Penn State College 40
- Impact Testing Symposium at Annual ASTM meeting 42
- Cost Retards X-ray for Castings Examination 46
- Reviews Steelmaking as Practiced in Great Britain 52

MATERIALS HANDLING
- Interplant Shipping—Part II 43

HEAT TREATING
- Carburizing Ring Gears 49

PROGRESS IN STEELMAKING
- Reheating Furnaces 53

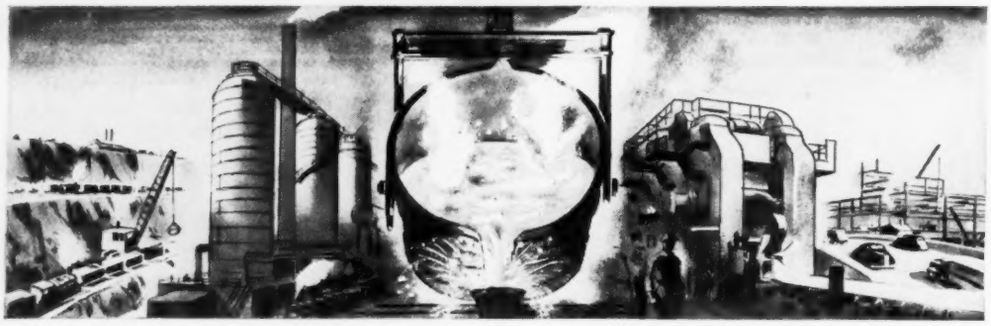
WELDING
- Refrigerator Cases 55

INDUSTRIAL EQUIPMENT 57
HELPFUL LITERATURE 59
NEW METAL PRODUCTS 64
MARKET REPORTS AND PRICES 65
- The Market Week 66

BEHIND THE SCENES 78
CONSTRUCTION AND ENTERPRISE 84
INDEX TO ADVERTISERS 90

PRODUCTION · PROCESSING · DISTRIBUTION · USE

BIG BUSINESS—NO. 9



The Industry for Industry

STEEL—the master tool of civilization—has been a dynamic force in American progress.

The American standard of living is made possible by more than 100,000 steel products—things we use directly, such as refrigerators and automobiles, and the things which serve us indirectly, like machines, bridges and power lines. The amount of steel in use in this country is estimated at 18,000 pounds per person, which is 50% to 200% more than in other leading steel producing countries.

In 1865 the United States was producing only 3% of the world's steel. By 1900 it was producing nearly 50%. In 1937, however, America produced only 38%. The growth of the steel industry in America was not due so much to an abundance of raw material as to an abundance of private enterprise—the necessary alloy for human progress.

Individual initiative and steel seem mutually attractive. 9 out of 10 steel executives rose from the ranks. 93% of steel workmen rate as skilled or partly skilled. Steel is a progressive, rugged business ready to spend millions to keep its plants modern, to develop new processes and to further metallurgical research. More than $320,000,000 was so spent in 1937, without taking into account some $200,000,000 spent for maintenance and repairs.

The capital investment for each job in this industry is $11,500, and approximately 500,000 men are normally employed at wage rates which in 1937 were 25% above 1929—triple the average rate paid to steel workers in eight foreign countries. Taxes of $169,000,000 paid by the industry in 1937 were 65% greater than in 1929 and equivalent to $330 for each worker employed.

As bankers for commercial and industrial enterprises, it is part of our responsibility to contribute something to a better understanding of the facts about private business.

BANK OF NEW YORK
& TRUST COMPANY

NEW YORK'S FIRST BANK • 48 *Wall Street, New York* • FOUNDED IN 1784

UPTOWN OFFICE: MADISON AVENUE AT 63RD STREET

Copyright 1938—Bank of N. Y. & Trust Co.

As the Editor Views the News

■ DESPITE the existing low rate of steel production, a fairly optimistic atmosphere characterized the forty-seventh general meeting of the American Iron and Steel institute, in New York last week. An abiding faith in the industry's future was apparent in the utterances of various speakers. The extent to which the industry has progressed in anticipating consumers' demands was revealed strikingly (p. 15) in the discussions. Of particular interest was the statement by E. T. Weir, chairman of the institute's new committee on public relations, that the steel industry is not telling its story to the public. This condition, he intimated, is to be changed materially in the near future. Some 1000 members of the institute, or about one-third more than on any previous occasion, were in attendance.

• • •

Business this summer may touch the 1932-3 level but no further decline of wide scope is anticipated; for the present a conservative buying policy that limits its commitments to early needs is advisable. This is the view of the business survey committee (p. 23) of the National Association of Purchasing Agents, presented at that body's convention last week. . . . Unless American designers of machine tools exhibit more daring and throw off the shackles of standardization they will lose world markets to foreign competition, it was said. (p. 25) at the spring meeting of the Associated Machine Tool Dealers of America last week. The meeting also revealed a number of design changes which are desired by domestic users. . . . Iron and steel exports were off slightly (p. 26) while imports showed some increase during April.

New Designs Are Needed

• • •

The first slab emerged last week (p. 20) from the new 46-inch reversing blooming mill of Great Lakes Steel Corp. Its principal output will be wide slabs for the company's 96-inch hot strip mill. . . . Steel production (p. 20) sagged 1½ points last week, to 28½ per cent of ingot capacity. . . . Automobile output (p. 20) declined 1690 units to 45,120, lowest volume since the 1938 model season got under way. . . . Open warfare by businessmen on the New Deal and all its works was advocated at the fortieth annual meeting of the National Metal Trades association last week (p. 18) and industrialists were arraigned for their supine attitude toward governmental experimenters and wasters. Factors that underlie successful labor relations received detailed attention.

Urges Fight On New Deal

• • •

Modern milk plants require much special machinery and equipment, with a large amount of instrumentation and control. One plant recently completed at a cost of $2,500,000 is especially notable because of the extensive use (p. 38) of stainless steel because of sanitary and maintenance considerations. . . . Rusting of steel in storage, due to condensation of moisture, may be eliminated (p. 39) by installing unit heaters. . . . In making large forgings (p. 40) the production of sound ingots is the most important single step, 450,000-pound ingots now may be cast from almost any alloy and given the required heat treatment. . . . Recent questionnaire of steel foundries (p. 46) showed that the cost factor is a handicap to the more general adoption of radiographic inspection methods.

Stainless In Dairies

• • •

Although continuous gas carburization of automotive ring gears is an application requiring careful study, one manufacturer (p. 49) finds that this method yields higher production and cleaner shop conditions. . . . Despite the fact that the steel industry is not now in a spending mood it is installing much new equipment that has an immediate effect in reducing costs. An example is a battery of modern ingot reheating furnaces (p. 54) whose fuel consumption is one-third less. Other advantages include control of scale and lower chipping costs. . . . A large manufacturer of refrigerator cabinets is obtaining continuous production at high speeds and reduced costs by use of special equipment and through correlation (p. 55) of all fabricating operations.

Saves by Spending

E. L. Shaner

Announcing Inland Ledloy

(Patents Applied For)

The Remarkable New Lead-Bearing, Free-Cutting Open Hearth Steel

Today's biggest news in the steel and metal working industries is Inland's development of Ledloy. Here are the important facts:

Inland Ledloy is a new open hearth steel with machinability improved 30% to 60%. It will machine even better than the best free-cutting steels now commercially available, including high sulphur Bessemer screw stock.

Inland Ledloy contains a small percentage of lead, which is added by a special process. The lead is in such a fine state of distribution that it cannot be seen under a microscope . . . The addition of lead has no effect upon the physical properties of the steel except to greatly increase machinability. Tool life is also appreciably increased.

Inland Ledloy, therefore, gives the user full advantage of all the desirable physical properties of open hearth steel, such as ductility, high impact values, transverse strength and effective heat-treatment and carburizing . . . with a saving of 30% to 60% in machining time.

Inland Ledloy is reasonably priced and will make important savings in manufacturing costs for its users.

Inland Ledloy can be produced in any rolled form, but is now made exclusively by Inland in hot rolled bars and sold to cold finishers for conversion into screw stock. For the present, it may be practical to serve Central States industries only. However, we expect to make arrangements so that other steel producers may also make Ledloy for complete national distribution.

Write today for the Inland Ledloy Bulletin. If your regular source does not have Inland Ledloy, we will be pleased to have you take the matter up with us.

FOR EXAMPLE

Savings Over Bessemer Stock

(Actual Production Operations)

Case 1. Form, thread, drill, ream and chamfer

	Time per part
High sulphur Bessemer screw stock (SAE-X1112)	43 seconds
Inland Ledloy 1120	33 "
Increased Production	*29.4%*

Case 2. Form, drill, knurl and chamfer

High sulphur Bessemer screw stock (SAE-X1112)	9 seconds
Inland Ledloy 1120	6.7 "
Increased Production	*34.3%*

These laboratory machining tests, involving sawing and drilling, show the increased speeds permitted over plain carbon and alloy steels:

	Time per part
.45% Plain Carbon Steel (SAE-1045)	68 seconds
.45% Carbon Inland Ledloy 1045	51 "
Increased Production	*33.3%*
.85% Carbon Steel (SAE-1085)	72 seconds
.85% Carbon Inland Ledloy 1085	56 "
Increased Production	*28.6%*

Screw machine tests on Inland Ledloy of .45% carbon steel (SAE-1045) show that it machines better than .35% carbon screw stock (SAE-X1335).

INLAND STEEL CO.

38 SOUTH DEARBORN STREET, CHICAGO

DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS • ST. PAUL

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES
STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Release of Pent-up Capital Essential For Real Industrial Improvement

By T. M. GIRDLER

■ ALTHOUGH the outlook for the immediate future is obscure, there appears to be no basic economic reason why this depression should be of prolonged duration.

The causes leading up to the collapse of 1929 had no counterpart last year. Nine years ago credit was dangerously over-extended, interest rates were high and a tidal wave of bank failures was close at hand. Today, none of these exist.

Someone has characterized this as an "under-investment" depression. The normal flow of capital has dried up, not because of any shortage of capital, but because of uncertainty or fear on the part of large and small investors.

Since 1933, bank deposits have increased by more than 17 billion dollars, and today are near the peak for all time. Clearly, then, capital is in plentiful supply, and therefore is available for investment if the investors have confidence in the immediate economic situation.

In the five years preceding 1933, investors of the country took approximately 25 billion dollars of new private security offerings. In that same period borrowings by the government were about 3½ billion.

Rapid Changes

In the next five years, private flotations dropped to 3 billion, while government borrowings rose to over 16 billion. A change so startling can mean only that investors generally have lost confidence in the prospects for private enterprise.

It is becoming increasingly clear that there can be no real and lasting improvement for industry until some way has been found to release the flow of capital into the productive channels of private enterprise.

There can be no objection on the part of industry to fair and reasonable government regulation. In this complex age, industry needs for its guidance certain rules and regulations by government—but rules that are not subject to constant and upsetting change.

One result of the direction in which we have been moving is written large in the unprecedented record of labor disturbances over recent years.

Perhaps no single cause has contributed more to the present widespread distress in this country than have the staggering losses in wages and in production resulting from these disturbances.

Lose 274,000 Years

In the last five years workers have lost nearly 100,000,000 days of productive labor from strikes. The worst of this has come about under the regime of a law which was heralded as ushering in a new era of industrial peace.

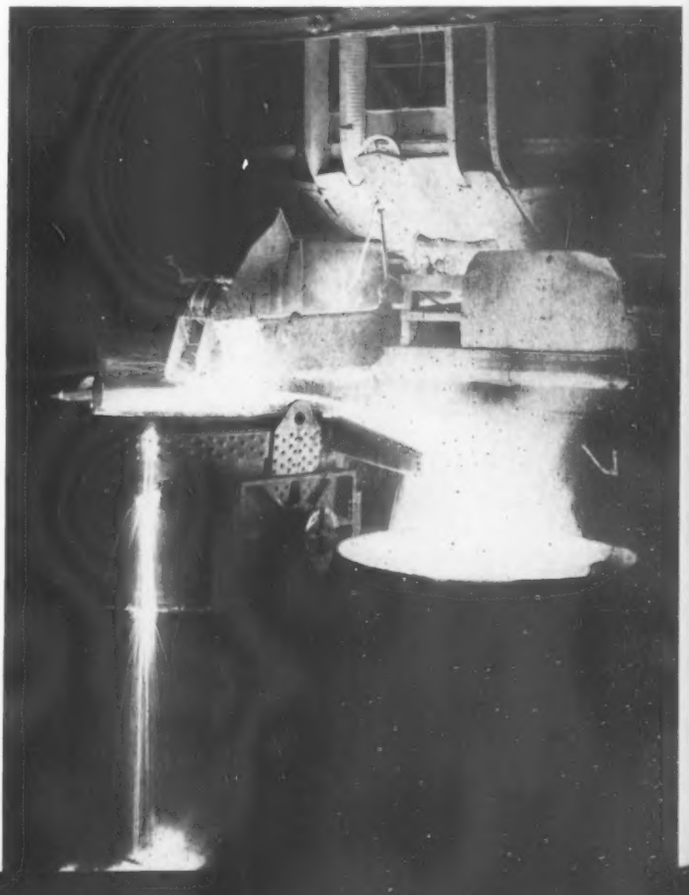
Actually because of the one-sided character of the act, and of its administration, it has come close to legislating the country into perpetual industrial warfare.

The industry is under recurring political attack because of so-called inflexible prices. Some critics, most of them pseudo-economists, with only a superficial knowledge, if any, of the realities of the steel industry, are fond of pointing to the prices of agricultural and certain other products on the one hand and the prices of steel on the other as evidence that this industry, by monopolistic methods, is able to manage prices and repeal the law of supply and demand.

Why, they ask, have steel prices not declined with falling demand, as prices of other products have?

The answer to that question is clear. It is simply that the immediate out-of-pocket cost of making steel is so large a proportion of its value that it is impossible for the producer who wants to survive to reduce his price materially unless the price of his labor, materials and

Steel and Slag



■ **Tapping 160-ton heat of steel in No. 5 open-hearth shop, Carnegie-Illinois Steel Corp.'s Gary works. As the last part of the heat flows into the steel ladle, the slag which floats on top of the molten steel is seen overflowing into the slag ladle. A blanket of slag is purposely maintained on top of the steel**

Abstract of address at the forty-seventh general meeting of the American Iron and Steel institute, New York, May 26. Mr. Girdler is president of the institute.

other important elements of costs fall correspondingly.

To avoid bankruptcy, it is absolutely necessary for steel companies to reduce output when demand declines. And experience has proven time and time again that price reductions for steel in times of falling demand do not stimulate buying.

That does not mean that steel is insensible to the law of supply and demand, which of course operates in every industry. But steel is a durable product. It is not eaten like wheat, or pork, or worn out as quickly as shoes or clothes. People can wait a while before replacing their old goods made of steel with new, and consequently the law of supply and demand operates more slowly.

Moreover, the cost of steel is only a small factor in the aggregate costs of most of the products into which it goes.

There is no mystery about steel prices. There is no hidden hand in the industry with power to prevent price reductions except the hidden hand of costs.

Accordingly, if steel prices have not declined in recent months it is simply because each producer knows his prices cannot come down in the face of present costs. A similar situation prevailed in the years between 1929 and 1933.

Prices were reduced and concessions of all sorts granted all along the line, and very shortly we had a condition of cut-throat competition which brought wide distress rather than increased sales.

By what standard can it be said that present steel prices are too high? Certainly they are not too high relative to costs. Certainly they are not so high as to result in excessive, or even large, profits. The record on that point is complete. Had prices been 10 per cent lower than they were in 1937, the industry's biggest year in production except for 1928 and 1929, the industry's profit last year would have been entirely wiped out.

What Is Normal?

Have steel prices moved away from their "normal" relationship with other prices? The answer to that is that there is no "normal" relationship among different groups of prices. What may appear to be "normal" this year may be wholly abnormal next year, because prices within the general structure do not move upward or downward uniformly or in the same degree. So-called relationships are always being disturbed.

The peak of steel prices in the post-war period was reached in 1923. From then on until 1933, with only a slight interruption in 1929, they tended downward.

The present price level is not as high as it was in 1923. It approximates the 1926 level, which year has frequently been put forth as the yardstick to go by. And that is true despite the fact that the wage rate in the industry is 28 per cent higher than it was 12 years ago.

Meanwhile, there has been a steady and in many cases extraordinary improvement in quality.

The highest single factor of costs in the steel industry is that of wages. In recent years we have witnessed a swift rise of wages, in steel as in many other industries. In steel the advance of wages has been more rapid than that of prices.

Wages in the industry were increased in November, 1936, and again in March, 1937. These two wage increases amounted approximately to 31 per cent.

They brought hourly earnings of steel wage earners to the highest level in the history of the country. The wage rate today is 25 per cent over the average of 1929.

Prices Go Up Slower

Meanwhile, what about prices? During the period that wages were going up 31 per cent, prices went up only about 20 per cent. And prices today are only 13 per cent over the 1929 level.

Compared with the bottom of the depression in 1933, hourly wages in the steel industry today are 56 per cent higher, while prices are but 34 per cent higher.

We are now tasting the bitter fruit growing from the fallacy of trying to boost income, output and employment by increasing costs. We are learning the costly lesson that high hourly wage rates do not of themselves insure either a full week's work or a full dinner pail.

The best interest of the mass of workers of the country is not served by the highest possible hourly rates of pay that can be exacted for some, but the highest possible annual earnings and employment for all. The only end that counts is the amount in the pay envelope on payday, and continuity of employment.

In some companies in certain industries experiments are being made with annual wage plans. Employers everywhere are watching these experiments with keen interest.

I would be happy, and I am sure every one of you here today would be happy, if it were possible to adopt a plan of annual wage in the steel industry. But obviously under conditions which subject an industry to such violent fluctuations as those in steel, any such plan would appear today out of the question.

It is a noteworthy fact, however that employment in the industry does not decline so rapidly or so greatly as demand and output.

Production of steel from the topmost point last year, which was in March, to the lowest point, which was in December, declined 72 per cent. Yet the number of people on the industry's pay rolls declined only 12 per cent, and pay rolls themselves fell off only 43 per cent.

The tax situation in the steel industry illustrates with powerful force what has been happening to all industry. In 1937, with net profits nearly 50 per cent lower than in 1929, on a production almost as large, the industry's tax bill was 65 per cent higher.

With a steadily rising public debt, and higher social security and unemployment taxes and momentary relief costs, the total tax burden will rise rather than decline.

The steel industry is destined, even in good years, to work for at least four or five months each year for the exclusive benefit of the tax collector before it can even begin to earn a penny for the owners of the business. Truly the stockholder is becoming more than ever before the forgotten man.

Although the immediate signs are not bright, I have not lost hope for the steel industry because I have not lost faith in America.

There will be a return, I believe, to some of the old and unshaken verities. People will learn again that only by work and increased production, and not by idleness of labor and capital, can wealth be made more abundant and living standards of all the people raised.

"Planned Economy" a Failure

They will learn that behind the false whiskers of so-called "planned economy" lurks the ugly countenance of the collectivist state. They will learn that true progress can be, and has been, accomplished more effectively by the free functioning of private enterprise than by any other economic system known to man.

The outstanding things that need to be done are, in the main, clear, definite and self-evident.

Congress has taken an important first step in revising the tax law to bring it much closer to the sound principle of taxation for revenue and away from the unsound theory of taxation for reform and punishment.

Other steps are urgently needed in such a program, some of the most important of which would include:

1. Development of a sound national fiscal policy.

2. Adoption of a predictable government attitude toward industry.

3. Such government regulation of industry as is in the public interest, but which does not compete with industry or put it in a strait-jacket.

4. Laying a foundation for industrial peace by sound amendments of the Wagner act, making it fair to employes and employers alike.

Drift with, or Stem the Tide – Two Expedients Presented to Institute

■ ONE THOUSAND leaders of the steel industry assembled in New York's Waldorf-Astoria last Thursday for the forty-seventh general meeting of the American Iron and Steel institute.

Attendance this year was restricted to the membership, and while not comparable to last year's record of 2000, it set a new record for institute members for recent years, if not for all time. An innovation was a commercial session, in addition to the usual technical session.

Intent on a thorough analysis of conditions which might indicate the way in expediting business recovery, members applauded Tom M. Girdler, institute president, and initial speaker. Chief difficulty at present, he said, is the drying up in the normal flow of capital, not because of any shortage of capital, but because of the uncertainty and fear on the part of investors. (For abstract of Mr. Girdler's address see page 13).

Speaking at the banquet, Gen. Hugh S. Johnson advised a "middle-of-the-road" course for industry.

"Business and industry," he said, "haven't any choice at all of going back to unregulated economic freedom under futile antitrust laws. It can't be done. . . . The best you can expect is regulated freedom—like all the rest of the folks."

Only alternative to a middle course, he declared, is to the left, toward which administration advisers are pulling.

"Third New Deal" Menace

"Today it is common Washington gossip that the planners of the Third New Deal intend to give industry exactly the same dose that Mr. Wallace is trying to choke down the farmers' throats.

"This new antitrust study that the President proposes is to be a witch-hunt to discredit business as much as possible and soften it up for Mr. Wallace's ever-normal granary for industry." To offset this, he advised adoption of collective bargaining and reduction in steel prices "even at a considerable sacrifice of profits."

"The whole country believes, including the foremost of independent economists, that iron and steel prices are too inflexible—sticky—and that their present levels are a principal influence retarding recovery. I know the pros and cons of this whole price problem. But you are butting up here against a growing flood of popular opinion that can't be diverted and resisted as it could in the old days."

In a reply, unscheduled, Mr. Girdler said the steel industry already was trying to do some of the things Johnson recommended.

"First of all, collective bargaining is no new thing in the steel industry—as a matter of fact, it started here," he declared.

"Nevertheless, I think it would be wise to ponder well what General Johnson has said and for each of us to go to work with our own pick and shovel and try to find out what to do to avoid this menace which the general has called the 'Third New Deal'."

Mr. Girdler said his company was losing $1,000,000 a month and that it would be no solution to change "to a schedule of lower prices and increase our loss to $2,000,000 monthly."

Charles M. Schwab, chairman, Bethlehem Steel Corp., spoke briefly at the banquet, giving a few reminiscences of his long career in the industry.

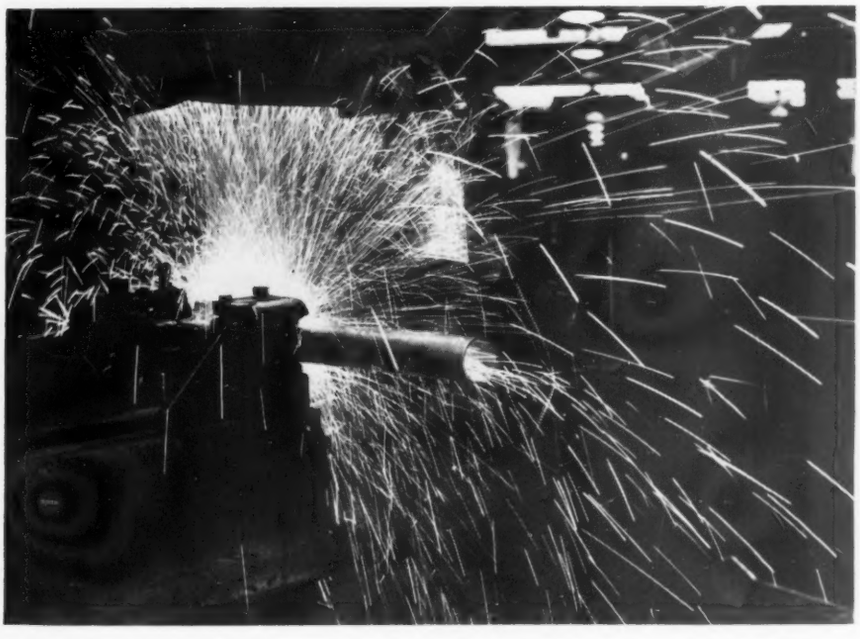
Speakers at the morning session, in addition to Mr. Girdler, were W. A. Irvin, vice chairman, United States Steel Corp., and E. T. Weir, chairman, National Steel Corp. Both are vice presidents of the institute.

"Industry Must Sell Itself"

"We simply are not telling the story of steel," said Mr. Weir in an address in which he strongly advised more publicity.

"The steel industry is by no means alone in this neglect. All American industry—so notably successful in selling its products—has distinctly failed to sell itself, and thus has neglected to give the people opportunity for a proper understanding

Sparks from the "Banjo"



■ **This pyrotechnic display results when the two halves of an Oldsmobile rear axle housing are welded at the central opening or "banjo". The housings are then completed by automatic seam welding machines which join the 43-inch long seams extending each way from the "banjo". Completed housings are produced at the rate of 53 each hour**

of the fundamentals on which industry must operate. . . .

"If the people were given the opportunity to judge on the basis of the whole truth, there is no question which road they would take. As it is politicians like Mr. Jackson (solicitor general of the United States) are able to attack our industry at will.

"Considering the prestige of his office and the plausible-sounding story that can be constructed on a framework of half-truths and untruths, is it any wonder that he is given credence by persons who do not have the opportunity to know the facts?

"For purely political reasons, he attempted to shoulder blame for this administration-created depression on what he called the monopolies in industry. And he classified steel as a monopoly. Let us consider some of the most flagrant charges that are made against the steel industry by Jackson and other orators of his stripe and weigh them against the facts.

"They say it is a monopoly or a near-monopoly when in fact it is one of the most highly competitive industries in the country. The very existence of National Steel Corp. is proof of the competitive character of our industry. Its development from a small beginning to its present status in the industry would have been impossible except under competitive conditions.

Cites Earnings

"They accuse it of maintaining rigid and artificially high prices . . . On the contrary, over the past ten years the industry's average return on investment has been only 3 per cent and it has never averaged as much as 5 per cent over any protracted period for which there are records.

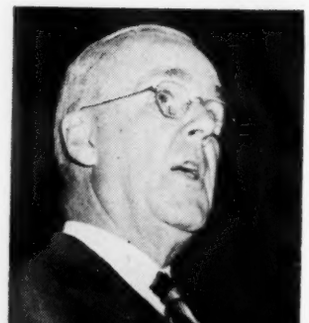
"In 1937—the third best year in its history from a tonnage standpoint—its net profit was a fraction more than 6 per cent and the indicated loss for this year will again result in a probable 3 per cent net profit for the two-year period."

"Critics placed steel at the tag end of the industrial parade in developing new products and improving its methods.

"The steel industry is doing its part in this respect to contribute to the total of all industry which today actually has 15,000 new products developed and ready to be put on the market the moment conditions warrant it.

"This will require new investment of $800,000,000 to $1,000,000,000 which is just the kind of prosperity-making buying power the critics are demanding—and preventing.

"From 1931 to 1937, inclusive, while the steel industry was earning a net of $190,000,000—seven-tenths of one per cent on investment—it was spending not less than $700,000,000 on modernization. Much of this money was spent on equipment to make new types of steel that stimulated modernization in the plants of steel customers."



E. T. Weir

"We simply are not telling the story of steel. . . . We may be assured that if the industry does not give facts, someone else will be only too ready to give fallacy."

Mr. Weir pointed out that a much larger proportion of the American people are in some way affected by the condition of the industry than is generally realized. The two groups closest to steel are the employes, with their families, representing approximately 1,500,000 persons, and the stockholders, who number more than 500,000. These should receive first consideration in any industrial program, he declared.

$10.000,000 for Research

Changing trends in the steel industry were graphically presented by Mr. Irvin, with emphasis on the growing use of thin light sections, particularly flat-rolled products and alloy steels.

Last year, he said, the steel industry spent more than $10,000,000 for research and development of new processes and products. As a result quality invariably increases more than the price, he added.

Last year, for instance, automobile fender sheets cost the automobile manufacturer 46 per cent less than in 1923, and 29 per cent less than in 1929. Again, the recent net selling price of steel going into the production of one-piece washing machine tubs was 42 per cent below 1923, and 26 per cent below 1929. Modern sheets are of such superior quality that a tub can be formed in a single drawing operation.

Gears made from alloyed steel bars are much stronger than they were in 1923 and it is estimated that the effective life of a gear tooth has been lengthened more than 500 per cent since that year. The price of typical gear steel in 1937 was 19 per cent less than in 1923 and only 7 per cent above that for 1929. Demand for steel of such quality is indicated by the increase in the electric furnace production to 814,000 tons in 1937 from 532,000 tons in 1929.

The industry has 28 continuous mills built or under construction, costing, with auxiliary equipment in excess of $300,000,000. However, he said, this was only one item, as in the 4-year period from 1935 through 1938 the industry will have spent approximately $840,000,000 for new equipment and construction.

Commercial Session

The commercial session was presided over by Walter E. Watson, vice president, Youngstown Sheet & Tube Co., Youngstown, O. R. E. Zimmerman, vice president, United States Steel Corp., presented the first paper on the subject of coupling sales to research. R. S. A. Dougherty, manager of development and research, Bethlehem Steel Co., Bethlehem, Pa., discussed Mr. Zimmerman's paper.

Three phases of research—economic, market and technical—are constantly pooling their efforts to simplify modern sales efforts, according to Mr. Zimmerman, who laid special emphasis on the growing importance of technical research.

Between sales and technical research, he said, there are three bonds, which are the scientific study of products, processes and long-range problems.

"Product research," he said, "is just one of a number of important factors which have a bearing, and without sales collaboration, could easily be excellent but futile."

In the case of automobiles, he explained, research and development have created markets and fostered sales practically to the limit of purchasing power.

Process research was described as affecting products in either or both of two ways that are of interest to sales department; first, by reduction of cost, and second, by better control and general improvement of quality. A study of the equilibrium between slag and liquid steel in the open hearth, or the subsequent deoxidation of the metal by one agent or another, may seem to be removed from the sales manager's office, he explained, yet they have a most important bearing upon the cost and physical properties of the product he sells.

Mr. Zimmerman said that long-range research concerned itself with the "possibilities of the day after tomorrow." It is coupled to sales by virtue of the fact that a sales

organization devoted considerable effort to reading the signs of the time and to interpreting the auspices.

Due to the greatly improved quality of steel in recent years, steel customers have been able to eliminate many steps in their manufacturing processes and otherwise reduce their costs, according to W. B. Gillies, vice president, Youngstown Sheet & Tube Co., in his paper "Promoting Demand Through Improving Quality."

Consequently demand for steel has been stimulated and at the same time the real cost to consumers has been generally lowered, although the cost in dollars may be slightly higher in some instances.

Mr. Gillies pointed out that the return on investment to steel producers has been notoriously low, indicating that the cost of improving steel quality has been absorbed by the steel companies.

"We should recognize that it is not sufficient to present only a record of comparative selling prices," he said. "We must go further and explain how economies which better steel quality has brought to fabricators and users of steel must be taken into consideration. This point can be established most impressively by citing specific examples like those of the automobile hood and the steam turbine."

Discusses Small Order

Development of many new types of iron and steel has changed the problem of the small order from a simple matter to one of consequential proportions, said N. J. Clarke, vice president, Republic Steel Corp., Cleveland.

The small order of alloy, forging or special steels presents particular difficulties, because of the varying processes of the manufacture of such steels. On the other hand, he added, merchant wire products and standard sizes of pipe can largely be eliminated from consideration for much of this business is based upon mixed carlot orders taken from stock.

Theoretically, quantity extras are supposed to compensate the steel manufacturer for the extra cost and trouble entailed in producing small orders. However, according to the speaker, definite experience has proved that in too many cases the extras do not accomplish such objective, regardless of size.

As losses result to the mills through filling small orders, he urged a program of education among sales personnel of steel producers, steel warehouse men and steel buyers to cope with the small order problems.

He believed that steel producers should encourage the placing of small amounts with warehouses, up to the point where orders are large enough to rank as desirable mill items.

Discussion of Mr. Clarke's paper was presented by W. A. Walker, executive vice president, Pittsburgh Steel Co.

Technical Session

Wilfred Sykes, assistant to the president, Inland Steel Co., Chicago, presided at the afternoon technical session which was devoted principally to discussion of blast furnace practice.

J. T. Whiting, vice president, Alan Wood Steel Co., Conshohocken, Pa., discussed the utilization of New Jersey magnetite ores in his paper, "Microscopic and Petrographic Studies of Blast Furnace Material." A new method of treating these ores was developed which resulted in greatly improved furnace operation and a saving in coke consumption of approximately 20 per cent.

In the discussion which followed, J. E. Lose, vice president, Carnegie-Illinois Steel Corp., Pittsburgh, said he thought two points were worth emphasizing. First, his experience with a furnace using a magnetic sinter is not directly applicable to the operation of a furnace using magnetite ore. Secondly, the improvement brought about by the use of crushed and sized materials was noteworthy.

H. W. Johnson, superintendent of blast furnace department, Inland Steel Co., Chicago, in his paper on "The Peripheral Distribution of Gases in the Blast Furnace," showed that measure and comparison of inwall temperatures at four equidistant points on the inner edge of the furnace lining, about 10 feet below the normal stock line, will provide a rough measure of the efficiency at which the furnace is working.

Charles M. White

Vice president in charge of operations, Republic Steel Corp., Cleveland, was awarded the American Iron and Steel institute's medal last week for his paper "Technological Advances in Steel Products," presented at the institute's meeting, May 27, 1937. The paper was printed in full in STEEL, May 31, 1937

In discussing this paper, William A. Haven, vice president, Arthur G. McKee & Co., Cleveland, said, "As Mr. Johnson so clearly indicates, the cause and effect relationships between conditions within the furnace and potentiometer readings, as one example of instrument control are still far from being properly understood. Even the crude symptoms formerly used were more properly evaluated. The work of Mr. Johnson, is, therefore, a big step in the right direction."

H. W. Graham, general metallurgist, and H. K. Work, director of research, Jones & Laughlin Steel Corp., Pittsburgh, collaborated in the preparation of a paper on "Iron Quality as a Problem of the Steel Industry."

It was pointed out that the blast furnace operator must understand and control a number of factors, such as chemical composition, physical structure, physical properties, uniformity and behavior in use as well as atmospheric conditions to make the best quality of iron necessary to make tailor-made steels.

As an example, he said that certain residual metals, such as chromium and tin, arsenic, antimony, etc., may under some conditions prove undesirable in steel although present in small quantities. Difficulties in welding have been traced to small amounts of chromium, he stated.

Affects Costs

"The comprehensive manner in which the authors have listed and discussed the variables in pig iron quality leads one to the conclusion that pig iron quality is of more direct influence on open-hearth conversion costs than on open-hearth steel quality," C. H. Herty Jr., research engineer, Bethlehem Steel Co., Bethlehem, Pa., said in discussing this joint paper.

"Proper methods and adequate facilities for carrying out slag control have widened the permissible range of iron analysis so greatly that it is seldom possible to observe a direct influence of iron quality, as indicated by analysis, on the finished steel composition or quality."

Professor Richard S. McCaffery, department of mining and metallurgy, University of Wisconsin, Madison, Wis., described the reduction of low-grade ores at the Corby, England, plant, in his paper on "A Study of Blast Furnace Slags."

All officers of the institute were re-elected: Mr. Girdler, president; Mr. Irvin and Mr. Weir, vice presidents; H. L. Hughes, vice president, United States Steel Corp., as treasurer; and W. S. Tower, executive secretary.

Industry "Arraigned" at Metal Trades Meeting

■ EMPLOYER-EMPLOYE relations, dependent on mutual confidence, are being threatened by demagogic New Deal legislation, notably the Wagner act, agreed most speakers at the fortieth annual meeting of the National Metal Trades association, New York, May 25 and 26.

Many indicated the government-labor alliance threatens the fundamentals of democracy.

Open warfare by businessmen on the New Deal and all its works was advocated by Percy C. Jones, president, S. M. Jones Co., Toledo, O., who arraigned industrialists for their supine attitude toward governmental experimenters and wasters.

He bluntly blamed business for cowardice and stupidity in a failure to resist governmental encroachment on public rights.

Mr. Jones followed Clare E. Hoffman, Michigan congressman, who handled the administration without gloves in the subject, "What the CIO Has Done to Michigan." Senator Josiah W. Bailey, North Carolina, speaker at the annual banquet, also condemned many administration acts.

Listing complex and punitive tax laws, governmental bureaucracy—with abuse of quasi-judicial power, fear of governmental intimidation, and impractical experimenters as the four major sources of the economic chaos, Mr. Jones placed blame squarely on the shoulders of businessmen for permitting themselves, their employes and consumers to suffer from the activities of the demagogues and theorists, saying in part:

Advocates Resistance

"The safest known political sport is that of assailing business. It is safe to assail business because we businessmen are dumb. The sport is safe because regardless of the falsity of statements or the viciousness of an attack, we never stand up and fight; we never answer back; we never utter a word in defense of our own rights, or the rights of those associated with us as shareholders or employes. When assailed we hide under the bed.

"I cannot say that we are dumb collectively, because we haven't sense enough to act collectively, and we are afraid to act together. And we refuse to create or even accept leadership.

"We know that political assaults always culminate in vicious and destructive legislation. We know the incompetents and the demagogues have destroyed business and employment. We know that in these days it is a part of our business to repel such assaults, to defend ourselves and our employes and demand proper and sensible legislation.

"On the contrary, we've let them get away with it. These bright young men in Washington—and let's presume that their motives are all right, which is a benefit of a doubt that they've never given us—have told the country, and made it stick, that we business men are the source of all evil. Maybe they mean well—and that's more than they'll say for us—but you and I and the people who work for us and with us and the entire population of the United States aren't doing so well regardless of their good intentions.

Even Washington Knows

"Let's be frank with ourselves. The employer knows, and the employe knows, and the farmer knows, and the consumer knows that we are in a very bad spot. I even suspect at times that Washington knows it.

"Let us also be frank in saying what we all admit to ourselves, and that is that since 1933 the Roosevelt administration has been conducting a political policy as old as Rome on the theory of 'divide and rule.'

"A good many of us and a good many of our fathers started from scratch with neither money, friends nor influence. We made our way because in this country, and in this country alone, there were no class hatreds and no caste barriers of birth or race or creed."

Mr. Jones urged members and all businessmen to enter the primaries and general elections and elect representatives, regardless of party labels, who will truly and honestly represent the best interests of all the people. The day is past, he declared, when business will serve submissively at the whipping post of political demagogues.

Assailing the Wagner act, Charles H. Strawbridge, president, said the chief reason for depressed business is "the fear, uncertainty and inability to deal with labor normally, which have resulted from the enactment of the Wagner law itself."

"As with all experiments of this kind," he said, "there will be future changes and revisions which will continually keep us in a quandary. In addition, questions have arisen where none should exist. For example, we wonder whether the federal government and many state governments will continue to condone the seizure of plant property through sit-down strikes and refuse to protect the employes, who want to work, from threats and intimidation by coercive groups.

"Industry must know definitely that its government will act impartially toward all groups in society and that it will fulfill its police duties when violence and disorder threaten."

Industrial curves of 1927 and 1937 were strikingly similar, but five employes were engaged in labor controversy last year as compared to one during 1927, Harold F. Browne, director of industrial management, National Industrial Conference board, New York, declared. While the government-labor alliance supplied the fuel, the rapid spread of strikes could be traced to additional causes, he said.

Evolution in the wage earners' thinking, fanned by a militant minority at first, has been largely responsible for nation-wide labor disputes, according to Mr. Browne.

Lack of steady employment and security for many workers were cited as factors in unrest.

Never before has industry gone such lengths to keep men employed in face of depressing influences, yet management's side of the economic situation is either given rare attention or badly presented.

Numerous have been the statements by government agencies, born of the New Deal, and prominent officials of the administration which clearly indicate a close link between such bureaus and labor unions, revealing a wide gap between them and business. Workers are naturally perplexed and often strongly influenced by such statements.

Better Contacts Needed

A new relationship has developed between the employer and employe, said Mr. Browne, urging the former to recognize the fact and meet the issue squarely. Real and closer contacts are needed, in his opinion, a relationship in which fear has no place. Confidence should prevail in the worker's mind. Steady employment is the strongest instrument with which to forge this relationship and Mr. Browne admitted this is a difficult problem, but urged everything possible be done toward its solution.

Reviews of industrial relations policies were given by C. S. Craigmile, vice president, Belden Mfg. Co., Chicago, and C. C. Winegardner, vice president, Diamond Chain & Mfg. Co., Indianapolis, Ind.

The Belden Mfg. Co. started departmental group meetings with

employes, 50 to a group, in 1933. Often minor differences which might have developed in major issues if fanned by an outside labor agitator, have been settled to the satisfaction of all, according to Mr. Craigmile. Any employe may make suggestions or complaints at the meetings. He may ask questions about the business and will be given a prompt answer. Financial details and other facts are carefully explained to employes.

Employes Like Plan

Results well established indicate employes like to be considered as having a part in the management of the business. They meet in personal contact with officers of the company and frequently have valuable suggestions.

The meetings also have a tendency to keep company management on its toes.

A labor relations policy adopted by the Diamond Chain & Mfg. Co. in 1920 was described by Mr. Winegardner. This is handled through a personnel organization in which is vested all authority in dealing with the men. The company's system involves no coddling, bonus or other inducements; it makes no pretense of giving the employe something for nothing and engages in no welfare work—only fair and aboveboard treatment. Pay rates are discussed with the men weekly. There are no foremen, but supervisors. All promotions are from within the organization.

Thirty-day leaves of absence are granted. A representative of the personnel department sees every man in the plant at least once every two weeks. When layoffs come, rights of senority prevail and every man is kept on the list for two years.

Birthday letters, notes regarding births, deaths and marriages are sent employes. All new employes are visited five times during the first week. They are made known to supervisors, executives and officers and at the end of 60 days are taken through the plant on an inspection trip. Service pins are awarded, wages advanced and loans granted. There is no hiring or discharging by supervisors, this being the right of the personnel department only.

Discussing the legal aspects of the national labor relations act, David R. Clark, Fyffe & Clark, Chicago recommended its outright repeal.

It breeds industrial warfare, provides for a one-sided enforcement of the government's union-organization policy, gives no protection to minority groups of employes, and is generally unfair, he charged.

Laws Reduce Payrolls

Pointing to defects in various unemployment compensation laws, W. E. Odom, William Odom Associates, Chicago, discussed salient features prevailing in many states. Some laws, he said, have undoubtedly caused a reduction in payrolls, with the release of employes who might otherwise have remained active even though at sharply reduced rates of pay. The net effect, he said, was the freezing of employment at consistently reduced levels.

Describing the success of the Evansville, Ind., Co-Operative league, T. J. Morton Jr., president, Hoosier Lamp & Stamping Corp., gave in detail the various steps to sell the plan through the press, films, radio and special speakers. Evansville has rallied to a square deal program, which includes the principle of collective bargaining, stresses the fact management and employes have a common interest in improving production efficiency.

Political and labor leadership has failed to successfully replace that of free industry, enterprise and management, said Allen W. Rucker, president, Eddy-Rucker Nickels Co., Cambridge, Mass.

"At the cross roads" is his description of America's position. It fears to move either to the left or right or grant great power without means of checking that power. He noted failure of the Supreme Court packing and re-organization bill as fears toward moving more to the left. On the other hand, many fear to give management of industry a free hand in the move to the right.

Reporting progress on job evaluation, O. D. Reich, vice president, Dexter Folder Co., Pearl River, N. Y., declared the need of definite data on the subject was great; that wage differentials should be approached and fixed more scientifically, assuring fairness to both the employe and management. Others speaking on this subject, telling of systems already in operation as well as the results of surveys or experience were: S. L. Burk, Atlantic Refining Co., New York; D. W. Weed, General Electric Co., Schenectady, N. Y.; W. J. Donald, president, and A. L. Kress, National Electrical Manufacturers' association, New York.

Officers Elected

N. W. Pickering, president, Farrel-Birmingham Co. Inc., Ansonia, Conn., was elected president of the association for the coming year. A. H. Timmerman, vice president, Wagner Electric Corp., St. Louis, was named first vice president, and Roe S. Clark, vice president, Package Machinery Co., Springfield, Mass., second vice president. Concilors for two years: R. W. Gillispie, the Jeffrey Mfg. Co., Columbus, O.; George A. Seyler, the Lunkenheimer Co., Cincinnati; Harold S. Falk, the Falk Corp., Milwaukee; R. H. Doodwillie, Otis Elevator Co., Yonkers, N. Y.; D. Norris Benedict, Frick Co., Waynesboro, Pa.; and Charles H. Strawbridge, Goodman Mfg. Co., Chicago, retiring president. Louis Ruthenburg, Servel Inc., Evansville, Ind., was made councilor to fill an unexpired term.

High Tensile Steel, Welded, Cuts Weight 8300 Pounds

■ **One of a series of 50 light box cars built recently in Bethlehem Steel Co.'s Johnstown, Pa. plant. Use of high tensile, corrosion-resistant steel, and extensive welding brought the net weight down to 36,900 pounds, or 8300 pounds less than that of the standard Association of American Railroads box car. Sides and roofs are sheets 0.05-inch thick, about half the thickness used in cars made of ordinary steel**

New Blooming Mill Is Started

■ FIRST slab to emerge from the new 46-inch reversing blooming mill of Great Lakes Steel Corp., Ecorse, Mich., was clocked 2:35 p.m. May 23, as George R. Fink, president, and a large group of executives and operating men witnessed the christening of the new bloomer which will roll in widths up to 62 inches.

Initial ingot to pass through the mill was 26 x 47 inches in cross section, 72 inches long; the resulting slab measured 5½ x 43½ inches in cross section, 16½ feet long, and weighed 12,580 pounds. Second ingot was larger, 22 x 66 inches in cross section, and was rolled into a slab measuring 4½ x 60¾ inches and weighing 15,010 pounds.

The blooming mill, located in line with the 96-inch hot strip mill, was installed primarily to produce wide slabs for the latter mill. Arrangement is such that slabs can be delivered directly from bloomer to strip mill without rehandling or reheating.

Long Spindles Used

The equipment is housed in a building 100 feet wide and 250 feet long, served by 75-ton and 25-ton cranes.

The motor room which houses the 7000-horsepower, 600-volt, reversing motor, motor-generator sets and other auxiliary equipment has no windows, all equipment being air cooled and the building ventilated. Unusually long spindles are used between pinions and mill rolls, the mill having a lift of more than 66 inches and the screwdown operating at a speed of 108 inches per minute.

Because of the mill's high speed, special precautions were taken to provide proper lubrication. For the screwdown a special oil recirculating system is provided, while an independent recirculating system is provided for the pinion stand. All table rollers, bearings and auxiliary equipment are lubricated through automatic greases lubricating systems.

Slab shear has capacity for cutting 6 inches thick and 62 inches wide. Crops fall onto an underground conveyor which carries them to a crop pit outside the building. A crane and magnet transfer the crops to cars. Motor-driven gage on the shear permits cutting slabs having a maximum length of 21 feet.

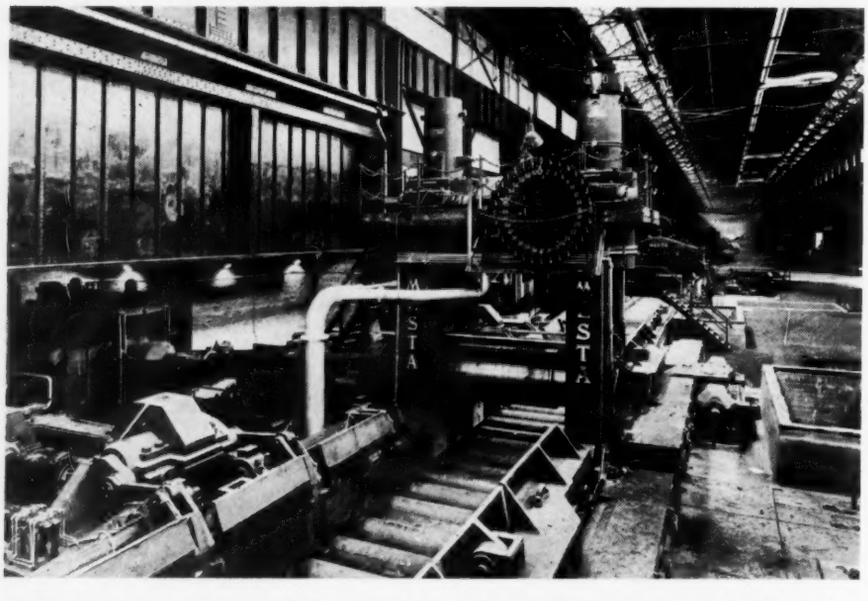
Mill and tables were built by Mesta Machine Co., Pittsburgh. Motors and electrical equipment were furnished by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Ward-Leonard controls are used on the screwdown, front and back mill tables, manipulator and slab shear. Foundations, buildings and auxiliary equipment were designed and installed under direction of the Great Lakes Steel engineering department.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended May 28	Change	Same week 1937	Same week 1936
Pittsburgh	22	— 8	94	63
Chicago	29	None	75	68
Eastern Pa.	27	None	72.5	43
Youngstown	27	+ 1	30	76
Wheeling	41	+ 3	96	70
Cleveland	26	+ 3	65	75.5
Buffalo	21	— 4.5	91	81
Birmingham	69	+ 6	83	69
New England	30	None	55	77
Cincinnati	28	—17	90	72
St. Louis	33.3	None	94	†
Detroit	18	None	95	88
Average	28.5	— 1.5	75	66

†Not reported.



■ General view of Great Lakes Steel Corp.'s new 46-inch reversing blooming mill, with 96-inch hot strip mill in the background

PRODUCTION

■ NATIONAL steel operating rate receded 1.5 points last week to 28.5 per cent. Memorial day will tend to reduce output this week.

Youngstown, O. — Advanced 1 point to 27 per cent, regaining the loss of the preceding week. The outlook is for unchanged operations, except for a shutdown on Monday.

Pittsburgh — Sharp decline in activity by major producers caused a drop of 8 points to 22 per cent.

Wheeling, W. Va.—Advanced 3 points to 41 per cent.

Cleveland — Up 3 points to 26 per cent, one interest adding an open hearth. Further increase is indicated for this week as Otis Steel Co. lighted two open hearths over the week end.

Central eastern seaboard — Irregular operations averaged 27 per cent, unchanged from the preceding week.

Cincinnati — Down 17 points to 28 per cent. One mill will suspend open-hearth operations from June 3 and use ingots from stock.

Detroit — Unchanged at 18 per cent.

New England — Steady at 30 per cent for the fifth week, with no change indicated for this week.

St. Louis — For the third consecutive week the rate remained 33.3 per cent, with indications of its continuance.

Birmingham, Ala. — Up 6 points to 69 per cent, with addition of one open hearth for an accumulation of orders for heavy products.

Buffalo — Withdrawal of two open hearths caused operations to decline 4.5 points to 21 per cent.

Chicago — Unchanged at 29 per cent.

Auto Output Lower

■ Automobile production declined 1690 units last week to 45,120, lowest since the 1938 model season got under way. Comparisons, according to *Ward's Reports:*

	Week ended May 28	Week ended May 21
General Motors	20,300	18,550
Chrysler	7,000	8,550
Ford	12,760	14,885
All others	5,060	4,825

Monthly and yearly comparisons will be found on page 30.

MEN OF INDUSTRY

■ WILLIAM P. WOODSIDE, vice president, Climax Molybdenum Co., Detroit, has been nominated for president, American Society for Metals, to succeed Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass. Mr. Woodside is present vice president and had previously served as trustee and treasurer.

James P. Gill, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa., is the nominee for the office of vice president. Mr. Gill is elevated from the post of trustee. William H. Eisenman, 7016 Euclid avenue, Cleveland, was nominated to succeed himself as secretary for two years.

Nominees for the office of trustee for two years are Dr. Donald S. Clark, associate professor of mechanical engineering, California Institute of Technology, Pasadena, Calif., and Francis B. Foley, superintendent of research, Midvale Co., Philadelphia. These selections were made at a meeting of the nominating committee in State College, Pa., May 19. Nomination to the offices virtually assures election at the National Metal congress in Detroit, Oct. 17-21.

♦

Harry H. Green has retired as superintendent, Albion Malleable Iron Co., Albion, Mich., after 37 years active service.

♦

R. C. Wietersen has been named general purchasing agent, Hercules Motor Corp., Canton, O.

♦

Walter O. Briggs Jr. has been elected a director, Briggs Mfg. Co. He succeeds H. W. Griffith, who continues as secretary.

♦

C. J. Kennedy, associated with the McAleer Mfg. Co., Detroit, for a number of years, has been named sales manager.

♦

James R. Fuller, Verona road, Verona, Pa., has been named representative for the Salem Engineering Co., Salem, O., in the Pittsburgh district.

♦

Percy T. Oldham has been appointed manager of special sales for By-Products Steel Corp., division of Lukens Steel Co., Coatesville, Pa. Mr. Oldham joined Lukens in December, 1915 as assistant construction engineer and served in that capacity until 1925 when he became manager of flanging sales. He occupied this position for several

William P. Woodside

years, later becoming engaged in special sales work. He is a member, American Society of Mechanical Engineers and Engineers Club of Philadelphia.

♦

M. D. Carrel has been named manager of sales for Union Wire Rope Co., Tulsa, Okla., and Kansas City, Mo., in the central territory. His headquarters will be in Chicago.

♦

Andrew C. Graham, formerly manager of Jessop Steel Co.'s Chicago office for a number of years, has become associated with SKF Steels Inc., New York, as western sales manager, with headquarters in Chicago.

♦

George F. Emanuels, former district sales manager in southern California for Republic Steel Corp. and for a number of years prominently identified with the iron and steel industry in California, has opened offices in the Chapman building, Los Angeles, as a manufacturers' agent.

Percy T. Oldham

♦

Dr. Gerald L. Simard has become a research associate at Battelle Memorial institute, Columbus, O., where he will investigate the use of electron diffraction methods in the study of oil films.

♦

Paul S. Cecil has been appointed control engineer, Renown Stove Co., Owosso, Mich. A graduate of Ohio State university, he formerly was associated with the White-Orr Co., Columbus, O., and with Servel Inc., Evansville, Ind.

♦

C. E. Gischel has been appointed advertising manager, Walter Kidde & Co., New York, manufacturer of fire extinguishing equipment. Mr. Gischel was associated for a number of years with Quigley Co. Inc., New York.

♦

Walter D. Jones, vice president, International Business Machines Co. Ltd. of Canada, has been promoted to the newly created post of chairman of the board, while Alan F. Telfer, associated with the company's sales organization, has been promoted to secretary-treasurer.

♦

Walter K. Graham, annealing foreman at the Fairfield sheet mill of Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., has been awarded one of the five competitive fellowships offered through the Alfred P. Sloan Foundation for a year of graduate study in business administration and economics at Massachusetts Institute of Technology, Cambridge, Mass.

E. Scott Pattison, a member of the executive staff of G. M. Basford Co. Inc., New York, was also awarded a fellowship.

♦

J. C. Baldwin III has been elected executive vice president, Nitralloy Corp., New York, and A. T. Baldwin, treasurer. Ian Baldwin has been named assistant to Vice President Baldwin. Paul Fuller Jr. continues as president, Roy C. Wilson as secretary, Thomas K. Finletter as assistant secretary and Dr. V. O. Homerberg as technical director.

♦

Stanley H. Brown has been made vice president and sales manager, Electrol Inc., Clifton, N. J. He had been associated with Morgan J. Hammers, president of the company, for many years and is an experienced executive in the oil burner industry. Mr. Brown has appointed J. E. LaBahn as assistant vice president.

♦

W. E. Remmers, Electro-Metallurgical Sales Corp., has been

elected chairman, Chicago chapter, American Society for Metals. Other officers include: Vice chairman, H. S. Van Vleet, American Can Co.; secretary-treasurer, E. A. Terwell, Driver-Harris Co.; assistant secretary, E. A. Anderson, Revere Copper & Brass Co.

♦

G. V. Wood, for the past three years, managing director, Alluvial Dredges Ltd., London, has returned to this country to become Pacific coast manager for Taylor-Wharton Iron & Steel Co., with headquarters in the Balfour building, San Francisco. Prior to going to England he had been associated with Taylor-Wharton's Pacific coast office.

♦

Lee F. Adams, formerly associated with General Electric Co.'s commercial general department, has been named manager of the company's newly formed standards department. He will also act as assistant to E. O. Shreve, vice president. In his new capacity he will be responsible for co-ordinating all activities pertaining to development and application of standards throughout the organization.

♦

Harvey B. Mann, long identified with De Laval and Cochrane sales in the Pittsburgh district, has established an office under the name of Mann Engineering Co. at 429 Penn avenue, Pittsburgh, to represent the following manufacturers of engineering equipment: Fischer & Porter Co., Fuller Co., Richardson Scale Co., Springfield Boiler Co., Sterling Engine Co., and Bin Dicator Co.

♦

H. W. Graham, general metallurgist, Jones & Laughlin Steel Corp., Pittsburgh, has been named vice chairman, executive committee, Industrial Research institute, a new organization composed of scientific research executives of middle and small size industries. Maurice Holland, director, National Research council's division of engineering and industrial research, will act as executive officer of the institute.

♦

A. J. Jennings has been named general sales manager, Cleveland Worm & Gear Co., Cleveland, and of its affiliate, the Farval Corp., maker of centralized systems of lubrication. He has been directing Farval sales for many years, having gone to Cleveland in 1932 when the business was acquired by the Gear company and moved to Cleveland from Battle Creek, Mich. S. L. Eastman and C. R. Burrell will assist Mr. Jennings.

♦

W. P. Getty Jr., J. J. Coy and John S. Dodge have been appointed to the sales staff of the American

W. P. Getty Jr.

Screw Co., Providence, R. I. Mr. Getty will cover metropolitan New York and the state of New Jersey; Mr. Coy, the Middle West from Detroit; Mr. Dodge, New England.

♦

Charles S. Duvall, Maryland Bolt & Nut Co., has been elected president, Steel Club of Baltimore. Other officers are: Vice president, C. H. Michel, Maryland Metal Building Corp.; secretary-treasurer, H. R. Dorney, Jones & Laughlin Steel Corp.; directors, J. E. Aldridge, Koppers Co., Bartlett-Hayward division; F. H. Carter, Maryland Dry Dock Co.; Andrew J. Snow, Carnegie-Illinois Steel Corp.; Charles West, Youngstown Sheet & Tube Co.

♦

Joseph W. Nicholson, purchasing agent, central board of purchases, city of Milwaukee, was elected president, National Association of Purchasing Agents at the twenty-third annual international convention held in St. Louis last week. He succeeds George P. Brockway, American Optical Co., Southbridge, Mass., who becomes a vice president and member of the executive committee for 1938-39.

Other members of the executive

J. J. Coy

committee, comprising newly elected district vice presidents, include: J. F. Meyer, W. P. Fuller & Co., Portland, Oreg.; C. S. Worley, Consolidated Gas & Utilities Corp., Oklahoma City, Okla.; Erwin H. Doht, Mallinckrodt Chemical Works, St. Louis; F. H. Missig, Aluminum Co. of America, Detroit; Bernard H. Yardley, Stanley Works of Canada Ltd., Hamilton, Canada; Thomas D. Jolly, Aluminum Co. of America, Pittsburgh; Clifford J. Alexander, Shell Petroleum Corp., New Orleans; Warren W. Irwin, Strong Memorial hospital, Rochester, N. Y.; and John E. Connor, National Equipment Co., Springfield, Mass. G. A. Renard, New York, was re-elected secretary-treasurer.

The 1939 convention of the association will be held at San Francisco, it was voted.

DIED:

■ HENRY A. DEFRIES, 56, associated with the Ludlum Steel Co., Watervliet, N. Y., for about 15 years, and since 1930 special representative and sales engineer for the company at Cleveland, in that city, May 22. Mr. deFries was well known as an expert on corrosion and heat-resisting steels.

♦

Charles Stupka, 45, traffic manager, United Screw & Bolt Corp., Cleveland, in that city, May 17.

♦

R. C. Lewis, 41, sales engineer, Farrel-Birmingham Co. Inc., Ansonia, Conn., in an airplane accident, near Cleveland, May 24.

♦

C. L. Schoonover, president and general manager, Warren Tool Corp., Warren, O., in that city, May 23.

♦

William E. Stafford, 53, chief clerk, Joliet, Ill., works of American Steel & Wire Co., May 18. He had a service record of 33 years.

♦

Berford Brittain, 63, manager, Chicago district, Pittsburgh Piping & Equipment Co., in Chicago, May 22. He had been with the firm 23 years.

♦

Herbert M. Ramp, 69, formerly foundry superintendent, LaPorte, Ind., works of Allis-Chalmers Mfg. Co., at his home in that city, April 23.

♦

Oscar W. Johnson, general plant superintendent, Morgan Construction Co., Worcester, Mass., in that city, May 9. He had been associated with the firm 40 years.

Business as Viewed by Purchasing Agents; 1300 at Convention

■ BUSINESS this summer may touch the 1932-33 level, but no further decline of wide scope is anticipated. For the present a conservative buying policy that limits commitments to early needs is advisable.

This is the view held by the business survey committee of the National Association of Purchasing Agents and presented at the twenty-third annual international convention of the association last week at Hotel Jefferson, St. Louis. About 1300 members were present for the four-day gathering.

The report, given by F. J. Heaslip, chairman of the business survey committee and purchasing agent, Fairbanks, Morse & Co., Chicago, is a compilation of opinions of a picked group of purchasing agents from key industrial and agricultural sections of the nation.

Business currently was reported as slower than in April, commodity prices weaker and credit tighter. The credit situation is not acute, however. Inventories were described as slightly below those a month ago.

While it was pointed out that present conditions make it extremely difficult to predict future trends, "nevertheless, the abject fear that has been so prevalent within the multitude in similar times of the past is not evident at this time, and the consensus appears to be that greater depths are less probable than a turn for the better.

"In the meantime, manufacturing schedules do not warrant extensive commitments at this time, and any purchases ahead would be on an investment basis. This policy is not advisable."

Predicts Conservative Gain

A large part of the convention program was devoted to a discussion of federal legislation. One of the most optimistic notes regarding possible assistance to business by congress was sounded by C. M. Updegraff, associate counsel, National Association of Manufacturers, and editor, *N. A. M. Law Digest*. He stated it is not improbable that 80 to 100 conservatives will be added to congress in the fall elections.

It is futile to spend time in bitter criticism of existing legislation and its authors, Mr. Updegraff declared. Instead, he said, purchasing men should study the laws which affect their activities and attack the problem in a logical way by bringing pressure to bear on congress.

Discussing the Wagner act, Mr. Updegraff stated that if the present labor board is to be retained as an enforcement agency, it should be called as such and a separate and distinct, impartial tribunal set up in its stead. The labor board is an enforcement body rather than an impartial fact-finding agency and it was so constituted by the national labor relations act, he indicated.

"To me it seems clear that the act should be amended so that it will establish a real control over all labor matters, and set up a board of impartial character in a true semi-judicial guise," he added.

No "Change of Heart"

Recommendation that business men look to congress to correct harmful legislation and promote recovery also was given by Raymond Moley, editor, *Newsweek*, and a former adviser to the President. Mr. Moley made a strong plea that business concern itself with the qualifications of congressional candidates in the fall election.

"Six months ago we were, regardless of our economic views or political preferences, encouraged to believe that the President had experienced a change of heart and was willing to give American business a chance to try its own program of recovery," said the original "brain-truster." "During the six months that followed, events succeeded each other which left only a bitter disillusionment. Therefore, candor compels me to say that I am not optimistic about a change of heart on the part of the administration itself.

"The seventy-sixth congress may well be the most important in the history of the United States. Its major task is to vindicate the idea of a republic. One of its secondary tasks is the formulation of a consistent policy to govern the relationship between private enterprise and public authority . . . . Let us think of the national welfare first—of putting an end to economic drift, of stopping the loss of jobs, of stemming the tide of national poverty, and of healing the wounds in our national unity. Let us elect a congress with one simple mandate—Recovery."

The federal legislative trend is tending toward making an automaton of the average business man, Warren Bishop, editor, *Washington Newsletter for Manufacturers*, declared. "If we fix all wages and hours, then we must fix all prices," he pointed out. "The railroads are in that position today. Other industries may be."

Mr. Bishop predicted that some form of wage and hour bill will be passed at the present congressional session but said early revision of

5000-Pound Welded Phoenix for Western World's Fair

■ **This wrought iron Phoenix, 22 feet high, fabricated by more than 6800 feet of welds, will top the 400-foot Tower of the Sun at the 1939 Golden Gate international exposition, on Treasure island in San Francisco bay.**

The huge metal bird weighs more than 5000 pounds, and is made up of 700 separate hand-shaped sections of 16-gage copper-bearing ingot iron made by the American Rolling Mill Co.

It symbolizes San Francisco's rise from the ashes of its disastrous fire in 1906

the antitrust laws is improbable.

Much of the fear in business centers on activities of the labor unions and the national labor relations board, he indicated. Conciliation between various union factions must occur some day because the CIO is losing ground and eventually will be forced to sue for peace with the American Federation of Labor, according to Mr. Bishop. With regard to the federal drive against identical bids on cement, the speaker expressed the opinion that steel will be the next product to be attacked on this score, provided the government is successful in the cement case.

A threatened breakdown in the economic thinking of the public carries with it the danger of disaster to the entire country, Howard Coonley, chairman, Walworth Co., New York, warned the convention. Over-emphasis on the depredations of an extremely small portion of business men, he explained, has given the public a distorted picture of business as a whole and led to much ill-considered and unsound legislation.

Regulations and controls by the various government agencies have been multiplying with disturbing rapidity, Mr. Coonley continued, and any business man who takes the time to consider the list of such controls will be "amazed at the extension of the power of the government to determine his destiny—and the end is not yet in sight."

Daniel C. Roper, secretary of commerce, Washington, addressed the convention briefly. He indicated that low inventories point to renewed buying of consumer and durable goods in the not far distant future. There has been no over-building; labor, money and credit are plentiful; and the nation's banking system is sound, the secretary said in enumerating favorable factors in the situation. Also, prices of many commodities have declined to an attractive level, he added.

Sees Opportunity in Housing

Few previous opportunities in industrial history can compare with that offered American business in meeting the pressing demand for homes, according to Dr. A. A. Bates, manager, chemical and metallurgical division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Development of methods for continuous rolling of sheet steel, combined with the cheap, effective welding practices now in use, have made feasible the quantity production of low-cost but fully modernized homes which are needed by 75 per cent of the families of the country, Dr. Bates stated.

"I do not believe that we are coming to the age of the all-steel house," he added. "It appears to me much more intelligent to presume that the building industry will take equal advantage of the greatly improved ceramic and plastic materials now available and will combine these with steel to re-house America. I am convinced that before many more years most of you will be engaged in purchasing materials destined primarily for the production and furnishing of homes."

Exportation of scrap iron and steel was the discussion subject at the iron and steel session, sponsored by the national committee on iron and steel of the National Association of Purchasing Agents and presided over by Committee Chairman W. W. MacMillen, director of purchases, National Malleable & Steel Castings Co., Cleveland.

Scrap Exports—Pro and Con

While the question of whether foreign shipments of scrap should be limited was discussed pro and con by Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., and chairman, Independent Iron and Steel Producers' committee on scrap, and by Benjamin Schwartz, director general, Institute of Scrap Iron and Steel Inc., respectively, it was brought out by the latter that since the senate subcommittee considering proposed federal legislation to curtail exports has pigeonholed the bill, current deliberations on the subject constitute only an academic discussion.

Mr. Schwartz also indicated that while there is no likelihood of congressional action on the licensing of scrap exports at this session, future legislation may be introduced covering foreign shipments of all raw materials, including pig iron and semifinished steel. It seems improbable that scrap again will be singled out alone in the matter of export limitation proposals, he said.

Mr. Wolcott stated that the independent group does not seek a complete embargo on scrap movement from this country, but pointing out that the supply of old material is not unlimited, urged that conservation be instituted in order not to hamper domestic industry. In answer to the contention that scrap consumers should take advantage of the lower prices now available on scrap, Mr. Wolcott pointed out that the small steelworks and foundries financially are unable to speculate in raw material.

Attractive exhibits predominated the Inform-A-Show conducted by the association in connection with its convention. Seventy manufacturers representing a variety of products maintained display booths. Steel companies showing their products included: Acme Steel Co., American Rolling Mill Co., Bethlehem Steel Co., Copperweld Steel Co., Granite City Steel Co., Jones & Laughlin Steel Corp., LaSalle Steel Co., Missouri Rolling Mill Corp., United States Steel Corp. and Youngstown Sheet & Tube Co.

LABOR

SHEET, TIN PLATE GROUP RENEWS AMALGAMATED PACT

■ WESTERN Sheet and Tin Plate Manufacturers and Amalgamated Association of Iron, Steel and Tin Workers have renewed their sliding scale wage rate agreement, for one year, beginning July 1. Only minor changes were made.

John P. Hosack, vice president and treasurer, Mahoning Valley Steel Co., presided as chairman at the conference of representatives of the two associations in Chicago, May 18. B. Frank Bennett, president, Amalgamated association, was vice chairman. The Amalgamated wage committee was headed by Bennett, Ward Walcott, third district president, and Louis Leonard, secretary-treasurer.

At the outset it was explained by Bennett and Leonard that the agreement, as in the past, was to be made with the Amalgamated independent of the CIO and SWOC.

OTIS STEEL CO. ENTERS AGREEMENT WITH SWOC

Otis Steel Co., Cleveland, and the Steel Workers Organizing committee last week approved a "memorandum of agreement" on wages, hours and working conditions. Company agreed to recognize and bargain collectively with the union for employes who are members.

Memorandum provides for continuance of existing wages, a 40-hour work week, a vacation schedule as good or better than last year's. Wages, working conditions and other matters may be taken up at any time for discussion and suggested changes.

James F. Dewey, labor department conciliator assigned to the steel industry, was brought into the negotiations after an earlier agreement submitted by the union had been rejected by the company.

BAR MILL WAGES STEADY

Wage rates in bar mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will continue through June, at the same levels that have prevailed since June a year ago. Examination of sales sheets for May by representatives of the Amalgamated and the Western Bar Iron association in Pittsburgh last week disclosed no change in prices affecting wage rates.

More "Daring" Design Needed To Hold World Markets for Machine Tools

■ WITH foreign machine tool business accounting for so large a part of current activity, comments of foreign visitors to the spring meeting of the Associated Machine Tool Dealers of America at Dearborn, Inn, Dearborn, Mich., May 23-24, were received with more than passing interest by 200 of the nation's machinery dealers and guests.

Among the visitors from abroad was E. H. Jones, E. H. Jones Machine Tools Ltd., London, who reviewed briefly the position of the machine tool dealer in England. He pointed out that "the manufacture of machine tools has been neglected to a great extent in England and it is only during the past few years any serious attention has been given to the industry.

"Less than 50 years ago in England criterion of value in a machine tool was weight, and one expected to pay about $200 per ton. Machines bought under such conditions necessarily were crude and were made by small manufacturers whose ratio of profit was so small they could not give other than a small discount. Consequently, manufacture of such material was not attractive.

"In America, industry is of more recent growth and as need arose men without preconceived ideas stepped forth and solved problems in their own way; hence material vastly better than that produced in England soon became available and set a fashion which has been copied throughout the world. The dealer in England could make little money selling home produced material and as the demand for better classes of machine tools arose it had to be filled with imported material which could only be handled by a merchant. Of every five machines sold to British industry, not less than two are imported.

Dealers' Discount Inadequate

"Growth of machine tool manufacture in England has not improved the positions of dealers and few are of the type common in America. The English manufacturer prefers to sell his own product through his own organization, but occasionally he will make use of a free-lance dealer on salary and commission lines; but if a merchant seeks to buy he is offered wholly inadequate discounts. Consequently, he concentrates upon the sale of imported machine tools which afford him a better return, and the English manufacturer creates intense competition as a result of which more imported material is sold than would be the case if a satisfactory return could be obtained by the sale of the home product.

Features of foreign-built equipment on display at the 1938 Leipsig Fair were discussed by N. P. Lloyd, Lloyd & Arms Inc., Philadelphia. He predicted that unless American designers exhibit more daring in their designs and throw off the shackles of standardization, they are going to lose world markets to foreign competition.

Among advanced features of foreign equipment noted by Mr. Arms were: Built-in object illumination; improved measuring devices capable of easy reading; recess-mounted controls; a notable simplification of controls brought about by such means as concentric mounting; and extended use of low-pressure hydraulic systems.

Selling conditions in Holland, Belgium and France, were reviewed by Hugo Stokvis, president, R. S. Stokvis & Zonen, Rotterdam, Holland. In his own country, shipbuilding is the chief industry as it has been for 300 years. There, American tools are considered original in design and embodying good precision and high output capacity.

In Belgium, with only 15 per cent of the country's production remaining at home, the balance exported, less expensive machines are demanded, which practically excludes American machinery.

French Want Long-Term Credit

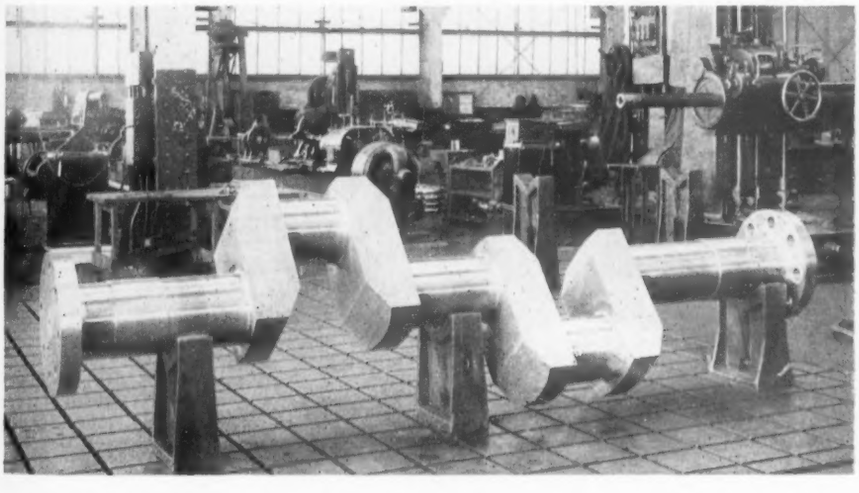
In France the need is for high-production tools and there is a fairly widespread market for such equipment. However, much of this business is contingent upon extending credit longer than six months, which American builders are not willing to do. Further, setting of import quotas has restricted sales of certain items, such as American small tools.

Opening session of the two-day meeting was in the form of a sales clinic, introduced by A. G. Bryant, president of the dealers' association, and head of Bryant Machinery & Engineering Co., Chicago.

George Habicht, Marshall & Huschart Machinery Corp., Chicago, listed a number of salient points to be observed by salesmen in developing effective sales presentations. G. J. Hawkey, Cleveland Duplex Machinery Co. Inc., Cleveland, offered some interesting ideas on how the sales office can assist the salesman. J. C. Carlton, Calco Machinery Co., Philadelphia, emphasized the importance of selling facts in selling machine tools.

About 175 attended an informal banquet on Monday evening to hear an address by W. J. Cameron,

Forged Crankshaft Meets Rigid Specifications



■ One of six crankshafts furnished United Shipyards Inc. by Erie Forge Co., Erie, Pa., for new Staten Island ferryboats. Each crankshaft is almost 13 feet long; journal and crankpin diameter is 12½ inches; weight finished is 9030 pounds. Forged from 0.40 per cent carbon steel with 3 per cent nickel, specifications required tension test bars from specified locations on each crankshaft, microscopic specimens and microphotographs. Tests, both longitudinal and transverse, exceeded requirements

Ford Motor Co., who roundly condemned propaganda against machinery as the cause of unemployment, and legislation which would tax machines and stifle invention. Such attacks, he pointed out, are fostered by those who know little or nothing of the values of machinery and who would be the first to protest should they be deprived of the luxuries and conveniences which our industrial civilization has brought.

Mr. Cameron urged industry to hold fast to its principles, despite the fact that it has been throttled, beaten, bludgeoned and taxed to the breaking point. He declared people of the country gradually are coming to realize industry is the only thing left to buoy their confidence, and that it must survive if the country is to survive.

What the typical buyer of machine tools wants from the machine tool seller was the topic discussed by David A. Wallace, president, Chrysler division, Chrysler Corp., Detroit. Speaking from first-hand experience in buying and installing new machinery for automobile production, Mr. Wallace divided his remarks into psychological factors and physical factors involved. In the first group, he pointed to the advisability of first selling the master mechanic on the values to be realized from new machinery. If the mechanical department can be convinced of the merits of machinery, then it is a simple task to follow through the purchasing department and close the order.

As far as machines themselves are concerned, Mr. Wallace listed a number of points of design on which he believed more work could be done advantageously by builders. Among these were: Better means of chip removal; improved filtering of cutting fluids and removal of residue; further progress in hydraulic equipment which, he maintained, still gives too much trouble; more attention to accessibility, safety, appearance and cutting tools.

Nominating committee was chosen to select new officers for the association; reporting on its choices at the fall meeting. The committee: W. F. McCarthy, chairman, Henry Prentiss & Co. Inc.; L. H. Schwind, Schwind Machinery Co.; C. H. Gosiger, C. H. Gosiger Machinery Co.; George Cherrington, Brown & Zortman Machinery Co., and J. M. Riordan, Riordan Machinery Co.

Foundry Equipment Orders Lower in April

■ Orders for foundry equipment fell off sharply in April, the net order index being 79.3, compared with 114.6 in March and 208.1 in April, 1937, according to the Foundry Equipment Manufacturers' association. Shipments declined in less degree, the April index being 93.4, compared with 99.4 in March and 232.5 in April, 1937.

In unfilled orders the April index was 158.2, in March 172.3 and in April, 1937, it was 365.4. Three months average of gross orders was 94.9 for April, 94.4 for March and 250.6 for April, 1937. Indexes are based on figures of 1922-24 as 100 per cent.

Add Movable Bridges To Beauty Contest

■ American Institute of Steel Construction again will offer stainless steel plaques for the most beautiful steel bridges completed in the United States in 1937. An innovation in this, the tenth, year's competition is introduction of a fourth class to cover movable bridges. Other classes are: Bridges costing $1,000,000 or more; bridges costing between $250,000 and $1,000,000; bridges costing less than $250,000.

Photographs of bridges to be entered must be received by the institute, 200 Madison avenue, New York, by June 11.

April Imports Up; Exports Decline

■ EXPORTS of steel and iron products in April, excluding scrap, were 179,250 gross tons valued at $12,061,586, compared with 188,235 tons valued at $13,991,641 in March, according to the department of commerce. Declines of 29.9 per cent in volume and 23.9 per cent in value were recorded when compared with 255,704 tons valued at $15,855,175 exported in April, 1937.

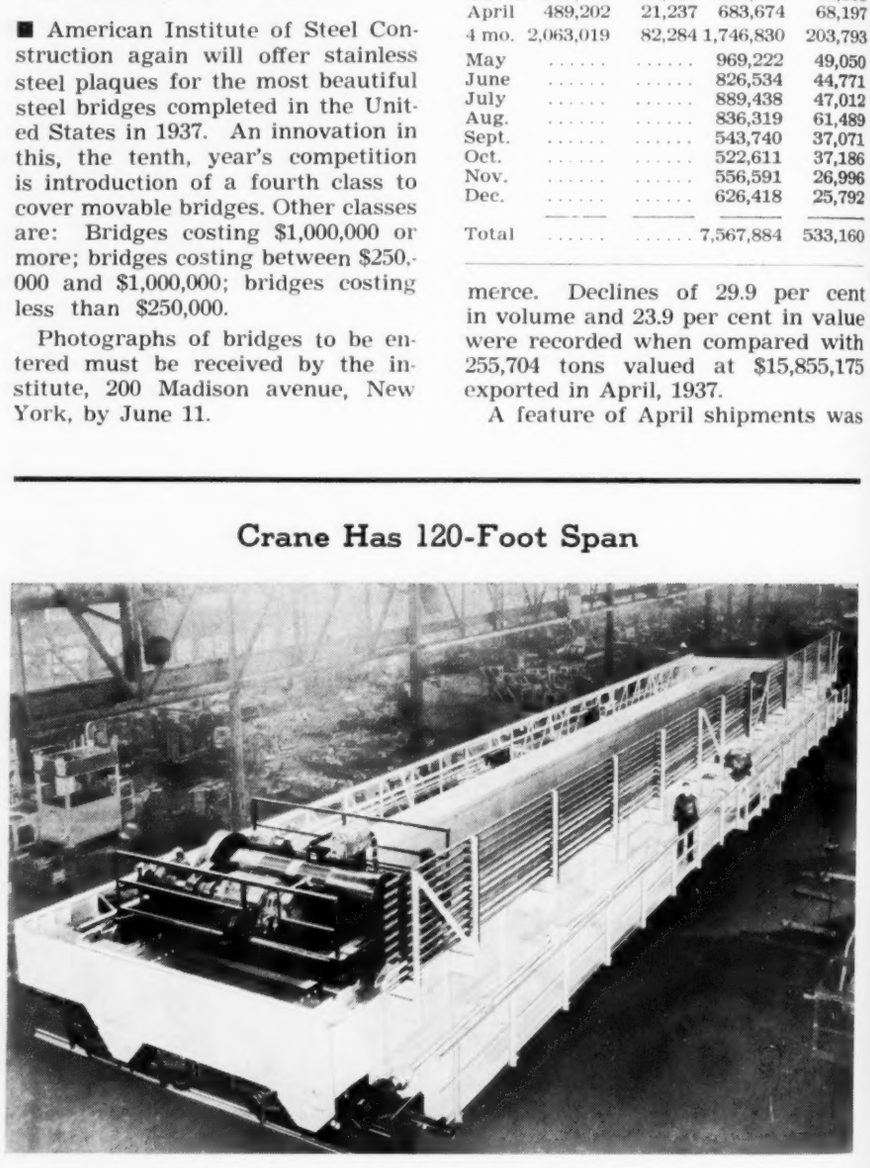
A feature of April shipments was

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1938		1937	
	Exports	**Imports**	**Exports**	**Imports**
Jan.	586,294	29,631	201,692	43,063
Feb.	460,640	19,589	290,987	40,728
March	526,883	11,827	570,584	51,805
April	489,202	21,237	683,674	68,197
4 mo.	2,063,019	82,284	1,746,830	203,793
May	.....	.....	969,222	49,050
June	.....	.....	826,534	44,771
July	.....	.....	889,438	47,012
Aug.	.....	.....	836,319	61,489
Sept.	.....	.....	543,740	37,071
Oct.	.....	.....	522,611	37,186
Nov.	.....	.....	556,591	26,996
Dec.	.....	.....	626,418	25,792
Total	.....	.....	7,567,884	533,160

Crane Has 120-Foot Span



■ **Illustrated is one of the 15-ton, 120-foot span, all welded mill type cranes being built by Cleveland Crane & Engineering Co., Wickliffe, O. Every major section of the crane such as trucks, girders, trolley and cage are fabricated into one-piece rigid units by welding. Bolts are employed only to tie major sections together because of shipping and erection limitations. Crane hoist is powered with a 100-horsepower motor, trolley by a 10-horsepower motor, and the bridge is equipped with two separate drives each powered by a 45-horsepower unit**

U. S. IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Articles	Apr. 1938	Mar. 1938	Jan. thru Apr. '38
Pig iron	3,823	746	17,670
Sponge iron	1	151	313
Ferromanganese (1)	986	1,058	3,325
Spiegeleisen	3,204	200	3,835
Ferrochrome (2)	17	.....	37
Ferrosilicon (3)	42	53	199
Other ferroalloys (4)	.....	.....	1
Steel ingots, blooms, etc.	4	.....	4
Billets	11	38	303
Concrete reinforc. bars	38	23	369
Hollow bar, drill steel	76	92	396
Bars, solid or hollow	1,462	1,140	5,859
Iron slabs	.....	.....	.....
Iron bars	112	9	247
Wire rods	271	369	1,732
Boiler and other plate	48	18	103
Sheets, skelp, saw plate	2,121	1,015	4,675
Die blocks or blanks	20	7	34
Tin plate, taggers' tin, terne plate	.....	12	20
Structural shapes	4,473	2,123	11,815
Sashes and frames	.....	.....	.....
Sheet piling	.....	.....	.....
Rails and fastenings	458	419	1,399
Cast iron pipe, fittings	16	238	508
Malleable iron pipe fittings	5	12	36
Welded pipe	101	265	1,270
Other pipe	259	1,083	9,480
Cotton ties	.....	.....	19
Other hoops, bands	1,579	724	5,743
Barbed wire	554	538	6,233
Round iron, steel wire	98	96	394
Telegraph, telephone wire	.....	3	5
Flat wire and strips	188	247	1,035
Wire rope and strand	185	228	791
Other wire	86	82	538
Nails, tacks, staples	561	365	2,360
Bolts, nuts, rivets	17	13	51
Horse and mule shoes	39	20	117
Castings and forgings	370	213	907
Total (gross tons)	21,225	11,600	81,823
Iron and steel scrap	12	227	461
GRAND TOTAL	21,237	11,827	82,284

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

the rise of pig iron to 44,362 tons from 22,519 tons in March. Steel ingots dropped to 7774 tons in April from 23,021 tons in March.

For four months this year exports of finished and semifinished steel and iron products totaled 801,092 tons valued at $53,655,125, compared with 732,575 tons valued at $48,901,613 in the corresponding period of 1937. Tin plate shipments in four months were valued at $8,278,094, the highest of any classification, compared with $10,219,853 for the corresponding four months of 1937.

Scrap exports in April totaled 309,952 tons valued at $4,846,323, against 338,648 tons valued at $5,530,042 tons in March and 427,886 tons valued at $8,340,759 in April, 1937. Scrap shipments in the four-month period totaled 1,261,927 tons valued at $20,864,295, compared with 1,014,255 tons valued at $18,825,273 in the corresponding period of 1937.

Imports in April, excluding scrap, totaled 21,225 tons valued at $1,140,875, against 11,600 tons valued at $990,379 in March and 56,484 tons valued at $2,709,526 in April, 1937. For the first four months imports totaled 81,823 tons valued at $5,226,897, in volume less than half the 185,281-ton total valued at $8,517,255 in the same months of 1937.

ORIGIN OF APRIL IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Sweden	15,521	.....	.....	.....
United Kingdom	30	.....	.....	.....
Canada	31	237	.....	.....
Australia	9,007	.....	.....	.....
Chile	143,400	.....	.....	.....
Netherlands	.....	98	.....	562
Norway	.....	2,988	.....	259
British India	.....	500	444	.....
France	.....	.....	14	84
Soviet Russia	.....	.....	3,720	.....
Gold Coast	.....	.....	3,002	.....
Japan	.....	.....	.....	81
Total	167,989	3,823	7,180	986

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
United Kingdom	4	6	41	.....
Belgium	683	3,125	607	960
Germany	1,434	28	180	173
France	.....	1,314	411	446
Canada	.....	.....	2	.....
Sweden	.....	.....	216	.....
Czechoslovakia	.....	.....	5	.....
Total	2,121	4,473	1,462	1,579

Machinery Exports Increase 10 Per Cent

■ Exports of industrial machinery in April were valued at $23,672,566, a gain of 10 per cent over shipments valued at $21,518,980 in April, 1937, according to the machinery division of the department of commerce. Increases over last year were shown in four groups and declines in three. Power-driven metalworking machinery made the largest gain, approximately 53 per cent. Exports in this group were valued at $7,861,515, compared with $5,119,671 in April last year.

Construction and conveying machinery gained 14 per cent, from $2,030,026 in April, 1937, to $2,289,740 in April this year. Mining, well and pumping equipment exports totaled $6,039,529, about 2 per cent over the same month last year.

Steelmen Join in Foreign Trade Week Observance

■ World trade dinners were held last week in principal cities in observance of national foreign trade week. Chief topics discussed were the government's reciprocal trade agreement policy and the increasing importance of world commerce to steel and other manufacturing industries.

Representatives of the tariff commission and other government departments explained procedure of arriving at trade treaties, told of progress already made, indicated early consummation of an agreement with the United Kingdom.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	April 1938	March 1938	Jan. thru April, '38
Pig iron	44,362	22,519	157,210
Ferromanganese and spiegeleisen	5	52	114
Other ferroalloys	83	202	522
Ingots, blooms, etc.:			
Not containing alloy	7,757	22,992	97,283
Alloy incl. stainless	17	29	648
*Steel bars, cold fin.	2,213	1,748	5,680
Bars, iron	89	180	681
Bars, concrete	1,085	2,167	6,219
Other steel bars:			
Not containing alloy	8,839	11,310	43,800
Stainless steel	16	10	172
Alloy not stainless	292	261	1,480
*Welding rods, electric	70	77	379
Wire rods	2,829	5,377	11,477
Boiler plate	753	515	1,738
Other plates, not fab.:			
Not containing alloy	21,215	17,768	77,366
Stainless steel	91	1	114
Alloy not stainless	564	259	1,297
Skelp iron or steel	2,752	1,623	5,506
Sheets, galv. iron	465	236	1,290
Sheets, galv. steel	3,284	8,070	20,214
Sheets, "black" steel:			
Not containing alloy	14,130	19,949	70,137
Stainless steel	57	720	961
Alloy not stainless	232	294	1,790
Sheets, black iron	318	488	1,896
Strip steel, cold-rolled:			
Not containing alloy	1,412	1,977	8,504
Stainless steel	11	16	170
Alloy not stainless	14	36	72
Strip steel, hot-rolled:			
Not containing alloy	1,928	2,968	12,595
Stainless steel	34	1	42
Alloy not stainless	1	7	21
Tin plate, taggers' tin	17,972	15,201	67,309
Terne plate	249	417	1,978
Tanks, except lined	2,030	2,690	12,192
Shapes, not fabricated	5,720	6,456	29,190
Shapes, fabricated	2,809	3,663	15,215
Plates fabricated	1,269	419	3,131
Metal lath	133	130	409
Frames and sashes	88	190	545
Sheet piling	171	331	1,379
Rails, 60 lbs.	5,572	6,981	30,097
Rails, under 60 lbs.	785	176	2,621
Rails, relaying	766	1,708	3,485
Rail fastenings, etc.	451	750	2,777
Switches, frogs, etc.	157	149	706
Railroad spikes	117	155	682
R. R. bolts, nuts, etc.	70	42	275
Boiler tubes, seamless	1,524	2,189	4,553
Boiler tubes, welded	46	28	93
Pipe:			
Smls. cas'g & oil-line	5,988	6,814	22,553
Do welded	483	2,060	7,607
Smls. black, ex. cas'g	628	890	2,322
Pipe fittings:			
Mall. iron screwed	257	291	972
Cast iron screwed	156	174	693
Pipe and fittings for:			
Cast iron pressure	941	937	3,573
Cast iron soil	705	967	3,190
Pipe, welded:			
Black steel	726	914	3,408
Black wrought iron	173	177	662
Galv. steel	622	1,233	3,899
Galv. wrought iron	87	105	932
Pipe and fittings:			
Riveted iron or steel	46	19	908
Wire			
Plain iron or steel	2,322	1,241	6,807
Galvanized	1,723	1,319	6,106
Barbed	2,443	1,638	5,805
Woven wire fencing	140	68	501
Woven wire screen cloth:			
Insect	13	12	51
Other	86	68	310
Wire rope, cable	359	446	1,328
Wire strand	91	126	403
Card clothing	.....	1	4
Other wire	414	451	1,850
Wire nails	1,354	1,408	4,732
Horseshoe nails	73	133	464
Tacks	21	27	74
Other nails, staples	390	245	926
Bolts, machine screws	671	806	2,793
Castings:			
Gray iron, semi-steel	326	267	1,129
Malleable iron	83	122	596
Steel, not alloy	130	75	350
Alloy incl. stainless	74	74	225
Car wheels, tires, axles	1,794	915	6,585
Horseshoes and calks	2	4	9
Forgings, n. e. s.:			
Not containing alloy	1,048	645	3,140
Alloy incl. stainless	34	36	170
Total (gross tons)	179,250	188,235	801,092
Scrap, iron and steel	306,900	334,742	1,253,050
Scrap, tin plate	1,348	1,657	4,359
Tin plate circles, strips, cobbles, etc.	1,292	475	2,137
Waste-waste tin plate	412	1,774	2,381
Total scrap	309,952	338,648	1,261,927
GRAND TOTAL	489,202	526,883	2,063,019
Iron ore (gross tons)	4,403	155	4,847

*No distinction prior to 1938.

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Production increases from 10% to well over 100 have been reported by manufacturers using Jones Laughlin Cold Drawn *Improved* Bessemer Screw Stock the manufacture of parts on automatic screw machine

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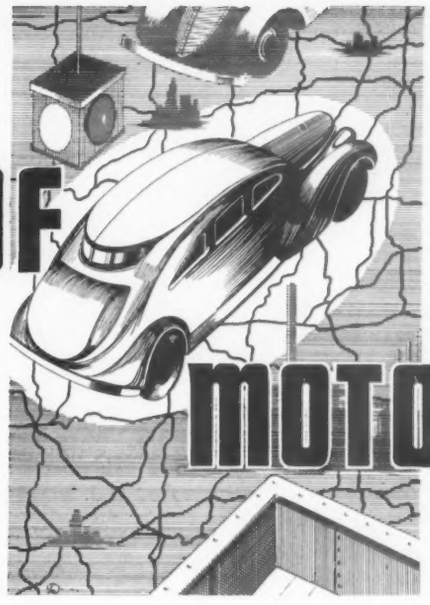
MIRRORS OF MOTORDOM



DETROIT

■ WIDELY circulated reports that Pontiac and Olds were planning to discontinue 8-cylinder models for 1939 have led to such an unfavorable reaction that steps have been taken to correct misapprehensions.

A statement from H. J. Klingler, general manager of the Pontiac division of General Motors Corp., reads in part as follows:

"Pontiac Motor will definitely continue to build an 8-cylinder automobile in 1939. This 8-cylinder volume comprises a valuable and growing part of our business, and we expect to make it even larger during the 1939 model run."

In a letter to all Oldsmobile dealers, C. L. McCuen, general manager, Olds Motor Works, said:

"Oldsmobile will continue to manufacture 8-cylinder motor cars—as well as 6-cylinder motor cars—in the 1939 model year."

■ CROSLEY'S "jitterbug", the small car developed by the Cincinnati radio interest and mentioned here briefly May 9, appears to be about ready to leap off drawing boards toward the production line.

Buying of parts is reported to have begun, and two former Hupmobile purchasing department executives—N. F. Lincoln and L. L. Haley—are now in Cincinnati to set up a purchasing organization for the Crosley venture.

Detroit sources indicate considerable difficulty was encountered in trying to achieve the $250 price tag originally planned for the new vehicle. After adding up figures on parts costs and applying a moderate profit, this price gradually climbed, until it is now nearer $350.

From the few details supplied by those who have been in touch with the Crosley organization, it is rather difficult to piece together an accurate picture of the proposed car, but, for what they are worth, here are some of the specifications being talked about:

Rear tread is about 15 inches, wheelbase 61 inches, front tread wider than the rear but not standard; motorcycle tires would be used; the car would accommodate only two passengers; engine is 2-cylinder L-head design (originally reported to be horizontal opposed type) with economy of 50 miles per gallon; regulation but smaller size generating and starting equipment is planned, this unit to be supplied by a Toledo, O., manufacturer at a reported cost of $4 per unit, compared with $6 for similar equipment supplied for the average low-price car. The baby-size engine (crankshaft about 8 inches long) will be built by Lycoming.

Crosley is reported to have set aside $2,500,000 for launching the new venture and the initial production order calls for 25,000 cars, to be made in the first four months. Crosley has about this number of dealers; thus each dealer could be alloted one car to start. Inquiries for material and parts are to be made on the basis of 100,000 assemblies.

BY A. H. ALLEN
Detroit Editor, STEEL

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Grinding Buick Rocker Arm Shafts

■ **Centerless grinding of Buick rocker arm shafts is accomplished on this battery of seven Cincinnati machines at a rate of 75 shafts per hour. Steel is S.A.E. 1010 welded tubing, case hardened. Outside diameter is within a range of 0.828-0.838 inches reduced in grinding to finished size of 0.810-0.811 inches. Length of shaft is 30 1/16 inches**

The job will be almost entirely an assembly proposition with a line being set up in the Crosley plant at Richmond, Ind. Naturally some new equipment — paint spray booths, portable tools, etc.—will be required.

It is not known definitely whether any deal has been concluded on body manufacture for the Crosley, but one of the local body builders is understood to be shaping up some samples to submit to Crosley on the possibility of getting the body contract. However, a local source is authority for the statement that Budd has an inside track on bodies for the "jitterbug".

■ SLEEP was cut short in Indianapolis on Decoration day, as three cannon shots reverberated through the city at 4:30 a.m., signalizing the start of the annual breakfast parade of AAA cars prior to the big race which started at 10 a.m.

For the past week or more automobile designers have been swarming down on the Indiana metropolis attempting to get a quick look at what smart race mechanics have developed for the 1938 speed and endurance event. One year Mr. Ford himself was pulled out from underneath a racer where he had been getting a mechanic's-eye view of a new design.

This year's cars will embody a number of design changes, because restrictions were lifted on oil and gas carrying capacity, and drivers will pilot cars without assistance of mechanics.

■ GRAHAM'S chances to pull through the current period of depressed sales have improved in the past week or two, following approval by 95 per cent of the company's creditors of a 5-year plan under which they would receive pro rata share of net income over the next five years.

Additional working capital has been added to the extent of about $500,000, half of which represents cash supplied by Joseph B. Graham. The balance is a federal loan against company's tractor division.

Production resumed in the body division of the company on a small scale last week and it is hoped to have finished cars coming from the assembly line by June 1 to fill accumulated domestic and export orders. However, it is not likely production of 1938 models will bulk large, for the company anticipates having 1939 models ready possibly as early as mid-July. In view of the comparatively few present models which Graham produced it is not likely many changes will be made in next year's line. For the present, plans on the new line are being held in abeyance until it is clear just how far the rest of the industry is going on the 1939 models.

■ COMPETITION between chromium plate and stainless steel goes merrily on, with no definite trend discernible in favor of either. One of the latest developments concerns a leading automobile producer currently using stainless steel screws for certain body work where appearance is a factor. Combination of the difficulties encountered in heading this type of screw and the fact that the corrosion resistance of the stainless steel was of no particular advantage, since the piece through which the screw was driven was the main concern from the corrosion standpoint, has just about persuaded engineers to switch back to chrome-plated screws.

Well-posted automotive engineers will tell you eventually stainless steel cannot miss coming into the automotive picture in a major way, but right now there is considerable backing and filling in regard to expanding stainless uses.

The Ludlum-Allegheny merger is looked upon as strengthening outlook for stainless. Allegheny in particular has been a powerful factor in spreading the gospel of stainless among automotive users, especially Ford.

Some good business for stainless steel producers should result from decision to fabricate the Norge refrigerator evaporator from stainless steel sheet in new refrigerators now being developed by this company. Steel will be fabricated at Muskegon Heights, Mich., and will follow the usual procedure in this part, one sheet being corrugated, then tack welded and roll-seam welded to a flat sheet, and the welded assembly formed into U-shape to make the evaporator chamber.

■ IT SEEMS to be a foregone conclusion around Detroit auto plants that June, July and August are going to be unusually slack months. A good many office workers are wondering whether executive and administrative departments will be kept open during the summer, in view of the fact operating divisions probably will be closed tight. Only the blackest pessimists are inclined to the view office forces will be furloughed, but it is possible a general adoption of the Briggs plan of reducing to a 4-day week with the consequent 20 per cent pay slash may be made. The further possibility of vacations without pay and confined to June, July or August is being mentioned.

While many divisions of Ford Rouge plant here were idle or in process of slowing down, still 38,000 of a normal 86,000 were at work last week. Reconstruction of Ford's nine open hearths is nearing completion. Last Tuesday, one furnace had been dismantled to the foundations preparatory to rebuilding, a second was being bricked up, a third was in the skeleton steelwork stage, several others have been completed. Steelwork has been completed on the 300 x 1200-foot tool and die shop and the roof and sidewalls are going up.

Steelwork on the L-shaped press shop is about half erected and electrical contracts, among others, have been let. Wiring will be all in underground tunnels and will come up into sheet steel junction boxes built around supporting columns.

A spokesman for the company stated that about $1,000,000 worth of equipment for the press shop is now being completed by suppliers; the balance has been held up temporarily, with no reason ascribed to this action except the suggestion some changes are being made in the program. It is believed the original program included another $4,000,000 for this equipment.

While it is true the 8-acre addition to the Ford foundry has been dropped for the time being, alterations and rearrangement in present foundry facilities are calling for expenditure of $550,000.

Heavy stocks of semifinished steel have been laid down at the Rouge plant. It is estimated 150,000 tons of billets alone are piled in the yards along Schaefer road, adjoining a collection of possibly 75,000 tons of scrap in various forms. This is one reason for the current suspension of steel production at the plant.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

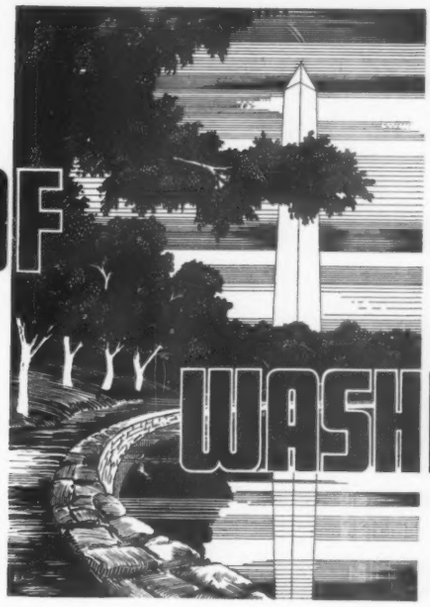
	1936	1937	1938
Jan.	377,244	399,186	227,744
Feb.	300,810	383,900	202,872
March	438,943	519,022	238,753
April	527,625	553,231	†238,133
4 mos.	1,644,622	1,855,339	907,502
May	480,518	540,377	*210,000
June	469,368	521,153	.....
July	451,206	456,909	.....
Aug.	275,934	405,072	.....
Sept.	139,820	175,630	.....
Oct.	230,049	337,979	.....
Nov.	405,799	376,629	.....
Dec.	518,958	346,886	.....
Year	4,616,274	5,015,974	.....

*Estimated. †Revised.

Week ended	
April 30	50,755
May 7	53,385
May 14	47,415
May 21	46,810

(Production figures for the week ended May 28 will be found on page 20.)

WINDOWS OF WASHINGTON



WASHINGTON

■ THE FACT that the administration did a lot of missionary work in the house is clearly shown by passage of the wage-hour bill last week, 314 to 97. This bill was once before pigeon-holed by the house membership, but following the recent primary in Florida, the administration renewed its efforts for passage and succeeded.

Last summer the senate passed a wage-hour bill which is entirely different from the present measure, which means that it must be sent to conference and then again pass both houses. However, there is no doubt the house will accept any kind of a wage-hour bill now to speed adjournment and opposition in the senate seems to have almost disappeared. Senator Pat Harrison, Mississippi, however, is on record as stating that he wants to talk "at length" on the bill, which may indicate that he will head a filibuster movement.

The bill which passed the house is known as an escalator type, as it starts in the first year with wages of 25 cents an hour and increases for three years at 5 cents an hour until a 40-cent limit is reached.

Two Bills Vary Widely

Also under the house bill, the maximum work week starts at 44 hours, graduating down at two hours a year for two years to a 40-hour limit. Administration of the bill as it passed the house is vested in the department of labor, while a board has charge of administration under the bill as it passed the senate. Also the senate bill is known as 40-40, being 40 cents per hour and 40 hours per week.

Before the house bill is sent to conference, it goes back to the senate on the chance that the senate might agree to the bill without conference. Those who have watched this legislation carefully, however, feel confident that the senate will not accept the house bill.

As the wage-hour bill passed the senate last summer, it embodied flexible differentials and established a separate labor standards board which would study local conditions before imposing minimum wages and maximum hours.

There is no question the wide divergence in the bills must be reconciled swiftly if the bill is to go to the White House for signature during this session, since the house is now through with major legislation and it is expected the senate will conclude action on its last major bill, the President's omnibus recovery measure, by the beginning of this week.

BY L. M. LAMM

Washington Editor, STEEL

SUPREME COURT TO ACT ON REPUBLIC APPEAL

The Supreme Court has under advisement an appeal of the national labor relations board from a decision of the third circuit court of appeals in Philadelphia, in connection with the board's case against the Republic Steel Corp.

The circuit court itself filed a brief with the Supreme Court last week setting forth its reasons for issuing a restraining order against the labor board in this case. Also the Supreme Court heard arguments by Attorney Luther Day, representing Republic Steel, and by Robert B. Watts for the board.

Mr. Day said that since the company and not the board had appealed to the circuit court "the appeal should be free from the control of the board."

The Supreme Court's decision in this case is expected to apply also in similar action involving the Ford Motor Co. and other concerns.

It will be remembered that the board a couple of weeks ago sought to withdraw the cases from the circuit court because of the possibility that procedure followed did not meet requirements set up by the Supreme Court decision last month in the Kansas City stockyards case.

In that case, the Supreme Court held that an intermediate report to which the company might take exceptions should have been made available. No such reports were made, with opportunity for rebuttal, in the Republic, Ford and other cases.

ROPER ASKS COUNCIL TO STUDY LABOR AND HOUSING

Secretary of Commerce Roper last week suggestetd a number of matters that he asked his business advisory council to study.

One matter was unemployment and on this subject he said: "Business and industry are conscious of the magnitude and importance of this and of the need of devising ways and means to solve the problem. This should be promptly and nationally met by leaders in all groups affected. Such a course would give renewed courage to the country generally at this time."

Mr. Roper called the council's attention to the housing program and had the following to say about that: "The various agencies charged with phases of this problem should be brought together in one national endeavor to meet the situation. I believe that I voice your views and that of business generally in saying that this is one of the major problems that should be wisely and promptly considered."

Another matter on which Mr. Roper asked further study by his council was of foreign trade in its relation to our national economy.

On the subject of our reciprocal trade policy he told the business council that "if the support of this foreign trade policy could be made nation-wide, so as to produce proper general understanding of its benefits on a national basis rather than solely the temporary disadvantages to individual industry, a very valuable contribution would be made to our future safety and national economy."

He also discussed with the council the question of industrial relations and credit and capital for small business.

BUSINESS AID CAN DO MORE THAN SPENDING PLAN

Membership of the United States chamber of commerce believes that measures looking to relaxation of obstacles and discouragement imposed upon business by the government would go farther towards increasing production and employment that can be expected from a huge new public spending program. In this connection the chamber has made the following statement:

"The public spending bill now pending in congress raises the critical question as to the method to be used by the government in promoting business activity and increased employment. There cannot be an issue of greater importance.

"The bill, which would greatly increase the expenditures of the United States—the money to be obtained from more borrowing—has been written on the theory that this spending of public money will take up the slack in the normal outlay of private enterprise not now being made by reason of depressed business conditions.

"The position given to the chamber of commerce of the United States by its membership is that the method to increase employment should be exactly opposite—that there should be immediate relaxation by the government of its excessive regulation, handicaps, and discouragements that have caused business recession, and a removal by the government of obstacles which it has placed in the way of new investments in private enterprise so badly needed to give additional employment and to increase production."

NLRB MEMBER DEFENDS ACTS, CRITICIZES COURTS

Sweeping defense of the national labor relations board and an attack on federal circuit courts for usurping the functions of the board were made at a convention here last week by Edwin S. Smith, a board member.

Smith severely criticized what he termed a drive against the labor board by newspapers and other publications and derided the decisions which have been rendered recently by various courts.

Smith assailed what he termed "emotional, highly-colored and utterly unreliable propaganda" about the board appearing in various publications. During the course of his talk, he warned against unwarranted judicial interference in the work of the board. He said:

"The public, including labor, which is the principal beneficiary of the national labor relations act, should be profoundly disturbed at the recent tendency exhibited in certain circuit court decisions to give little or no effect to the board's findings of fact. . . . The board's findings of fact, the statute expressly says, if supported by evidence, shall be final."

SALES TO ARGENTINE GROW AS EUROPE SELLS LESS

Department of commerce has issued a bulletin stating that participation of the United States in the Argentine iron and steel trade improved in 1937 owing in part to inability of European competitors to supply the market as promptly as in former years. Belgium, Luxemburg, and Poland also made gains at the expense of the usual large suppliers, Germany and Great Britain.

Large quantities of tin and terne plate of United States manufacture were used in the production of milk cans, coolers, and large dairy units, as well as by Argentine canning factories and packing houses. The only principal export of iron and steel which declined in 1937 was wire. The high quality of United States tools and hardware articles is well established, and exports of tools, locks, files, scales, automotive hardware, screws and bolts, showed substantial gains compared with 1936.

BERRY DESERTS NEW DEAL IN SENATORIAL CAMPAIGN

In view of the way in which the President has backed Senator George L. Berry during the past few years, considerable curiosity has been aroused within the last week because the senator has apparently severed political ties with the new deal by attacking the administration's new recovery program as unsound.

It will be recalled that Senator Berry was formerly director of industrial co-ordination, which in effect was competing with Secretary Roper's business advisory council, and at almost every turn the President backed the Berry organization rather than the Roper council.

Berry is just opening up his campaign for the senate to which he was appointed about a year ago. In discussing the recovery program last week, he said: "We should rededicate ourselves to the principle of economy in government." He said also that unless the budget is balanced soon, two things are inescapable, capital levy and repudiation of the public debt or inflation. Berry has been a labor leader for many years.

WIDEN WALSH-HEALEY ACT

A senate committee has favorably reported the amendment to the Walsh-Healey act which provides among other things that manufacturers making contracts with the government of $2000 or more will be amenable to the act rather than $10,000 or more, as at present. Shipbuilding has been included under the proposed amendment. A definition of open market purchases is also included in the amendment.

PLAN BASING POINT TEST

Washington observers who are in close touch with government purchases, with specific emphasis to the procurement division of the treasury department, state definitely that the government has failed in its effort to purchase cement on other than a basing point status.

Washington representatives of steel companies who bid on government work still maintain that it would be impossible to purchase steel on other than a basing point plan, but the reports are to the effect, that in spite of its defeat in connection with cement purchases, the procurement division will try this out in the case of steel. Up to this time, however, there has been no official announcement of such action.

SEEK VENEZUELAN TRADE

Announcement has been made by the state department that a provisional commercial accord has been signed between this country and Venezuela. The agreement is distinct from the contemplated reciprocal trade agreement, concerning which Secretary of State Hull made an announcement last October in which he said that this government contemplated negotiations of such a pact with Venezuela.

Under this temporary plan both governments will concede reciprocally unconditional and unlimited most-favored-nation treatment in all that concerns customs duties. The new agreement is to remain in force for a year or until superseded by a more comprehensive commercial treaty or until denounced by either country by advance written notice of not less than 30 days.

Schneider Iron Works Inc., 1805-1815 South Fifty-fifth avenue, Chicago, has changed its name to Schneider Metal Mfg. Co. Inc.

Public Relations Development Assumes First Place in Program of Business

■ WORTHY of close study is an address entitled "Public Relations—Industry's No. 1 job" which was delivered by Paul W. Garrett, director of public relations, General Motors Corp., before the recent convention of the American Association of Advertising Agencies.

It defines the correct answers to such fallacies as the one that sets up class hatreds by declaring industry is a device for the unholy benefit of a few economic royalists; that business went on a sit-down strike to embarrass the New Deal and labor; that the way to create buying power is to level down from the top; that the machine is driving men into idleness; that the salary of the boss comes out of the workers' pockets; that bigness in industry is synonymous with badness.

"Does that theory," asks Mr. Garrett, in referring to charges that management is overpaid at the expense of the workers, "not ignore the fact that the industrial worker himself is the principal beneficiary of the increased living standard resulting from industrialization; that management, without which there would not be industry, costs but a few cents a week for each worker? Is anything more costly than a failure in management? Is anything more expensive, to worker and consumer alike, than inefficient management?"

Understanding Inside Plant Leads To Confidence in Customers' Minds

Mr. Garrett found it difficult to understand why industrial leaders have been frightened into the notion that in developing good relations they must move with subterfuge, in secrecy, with doubt as to their approach, nor why industry should not discuss openly and frankly everything it does in a desire to create good relations.

"The most obvious lesson any company can learn and seemingly the most difficult," he continued, "is that good relations outside grow from good relations inside. If there is any secret to success in building good public relations it is that you must begin at home and work from the inside out. Begin in the plant if you want to be well thought of in the plant community. Begin in the plant community if you want to be well thought of over the nation."

There is a paramount need for all businesses, big and little, to plan their courses mindful that their existence is of the consumer, by the consumer and for the consumer. Likewise, labor must plan its course mindful that jobs and pay checks come first, last and all the time from customers of their employer, he said.

Good Impressions of Industry Must Be Multiplied Endlessly

Ten years from now American industrial leaders as a group, Mr. Garrett believes, will have become experts in the field of public relations just as they have learned to become experts in every field on which industrial progress depended.

"The art of public relations," he declared, "is in the art of multiplication—that is, the art of multiplying endlessly the good impressions of a company. It involves the honest but skillful employment of all the known media but, most important of all, a development of new approaches and a more advanced technique in their use. The multiplier in public relations to work effectively must be a 1950 model."

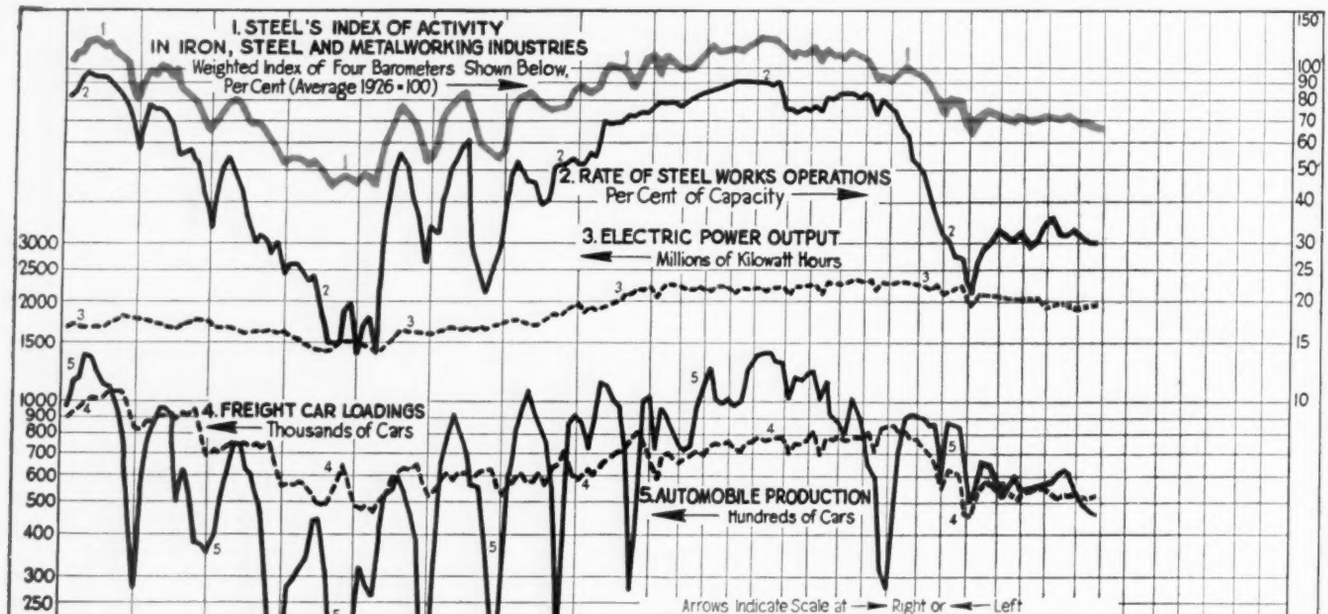
Mr. Garrett's clear definition of what comes under the head of public relations should prove an important help in enlightening industrial leaders as to the essence of their No. 1 job.

THE BUSINESS

Industrial Activity Continues Sidewise Movement

■ A CONTINUED depressed but sidewise movement in industrial activity has been apparent through May. Fluctuations in the principal barometers were minor throughout most of the month. As a result, STEEL's index of activity in the iron, steel and metalworking industries registered only moderate changes in recent weeks. The index stands at 67.1 per cent for the week ended May 21, lowest for any full week this year. In the comparable week in April the index stood at 70.8 per cent.

Automobile production has eased downward since mid-April, although the seasonal decline generally does not occur until later in the spring. Assemblies for the week ended May 21 totaled 46,810 units compared with 47,415 in the preceding week and with 131,306 in the corresponding week a year ago. Outlook for the summer months is not encouraging with stocks of used cars continuing

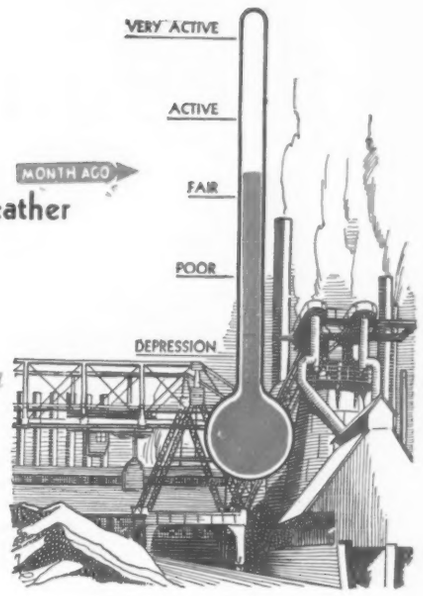

1. STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
Weighted Index of Four Barometers Shown Below,
Per Cent (Average 1926-100)
2. RATE OF STEEL WORKS OPERATIONS
Per Cent of Capacity
3. ELECTRIC POWER OUTPUT
Millions of Kilowatt Hours
4. FREIGHT CAR LOADINGS
Thousands of Cars
5. AUTOMOBILE PRODUCTION
Hundreds of Cars
Arrows Indicate Scale at → Right or ← Left
1 STEEL'S Index of Activity in Iron, Steel and Metalworking Industries.
2 Rate of Steelworks Operations, compiled by STEEL.
3 Weekly Electric Power Output, compiled by Edison Electric Institute.
4 Weekly Freight Car Loadings, compiled by Association of American Railroads.
5 Weekly Automobile Production, estimated by Ward's Reports.
Copyright 1938 STEEL
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938

STEEL'S index of activity declined 0.1 points to 67.1 per cent in the week ended May 21:

Week ending	STEEL's Index of Activity Index No. 1938	1937	Steelworks Operating Rate Per Cent 1938	1937	Electric Power Output Million KWH 1938	1937	Freight Car Loadings 1938	1937	Weekly Auto Output 1938	1937
Feb. 19	71.9	108.8	31.0	83.0	2,059	2,211	535,790	714,884	59,100	95,698
Feb. 26	70.3	112.8	30.5	84.0	2,031	2,207	511,930	696,727	56,977	111,915
Mar. 5	70.1	117.9	29.5	86.0	2,035	2,199	552,916	734,127	54,440	126,975
Mar. 12	70.8	112.7	30.0	87.0	2,014	2,212	556,664	748,993	57,438	101,684
Mar. 19	71.3	113.1	32.0	89.0	2,017	2,211	540,332	759,269	57,555	99,013
Mar. 26	72.4	114.0	35.0	90.0	1,975	2,200	572,952	761,109	56,800	101,046
Apr. 2	72.0	112.0	36.0	91.5	1,978	2,146	523,489	726,687	57,500	97,005
Apr. 9	71.3	112.8	32.0	91.5	1,990	2,176	521,978	716,044	60,975	99,196
Apr. 16	71.4	119.6	32.0	91.5	1,957	2,173	537,595	751,328	62,021	125,472
Apr. 23	70.8	122.0	32.5	91.5	1,951	2,188	523,767	761,182	60,563	133,164
Apr. 30	68.4	123.9	32.0	91.0	1,938	2,193	543,075	782,423	50,755	139,475
May 7	68.5	123.5	31.0	91.0	1,939	2,176	536,140	767,481	53,385	140,188
May 14	67.2†	123.2	30.0	89.0	1,967	2,194	541,813†	773,669	47,415	140,396
May 21	67.1*	122.2	30.0	91.5	1,967	2,198	543,438*	779,276	46,810	131,306

*Preliminary. †Revised.

STREND



Industrial Weather

TREND:

Unchanged

burdensome. Assemblies in July and August apparently will be at a very low level.

The rate of steelworks operations in the week ended May 21 was 30.0 per cent. This was unchanged from the preceding week. It is less than one-third of the 91.5 per cent reported in the similar week last year. The outlook for the summer months is for a still lower rate.

Revenue freight carloadings fluctuated between 523,000 and 543,000 cars per week within the last four or five weeks. The loadings were considerably less than a year ago. Electric power consumption receded to new low levels for this year in the week ended April 30. In fact, this was the lowest point for this industrial barometer since the week ended May 30, 1936. So far in May, however, power output regained all the ground lost since April 9. In the week ended May 21 power consumption registered a slight increase to 1,967,807,000 kilowatt-hours. This represents a decline of approximately 10.3 per cent from 2,194,000,000 kilowatt hours in the same week last year.

Activity, as measured by STEEL's index now is about 50 per cent below the peak of last year. Then the index stood at 123.9. A sidewise movement in activity, with few and slight fluctuations except of seasonal character, is indicated for the remainder of this quarter.

Where Business Stands

Monthly Averages, 1937=100

	Apr., 1938	Mar., 1938	Apr., 1937
Steel Ingot Output	**46.4**	**46.7**	**122.2**
Pig Iron Output	**45.9**	**47.6**	**132.6**
Freight Movement	**73.2**	**76.6**	**101.7**
Building Construction	**87.1**	**91.1**	**129.3**
Automobile Production	**56.9**	**57.1**	**132.3**
Wholesale Prices	**91.2**	**92.0**	**101.9**

The Barometer of Business

Industrial Indicators

	April, 1938	March, 1938	April, 1937
Pig iron output (daily average, tons)	46,267	47,851	133,469
Machine tool index	91.0	100.4	219.8
Finished steel shipments	501,972	572,199	1,343,644
Ingot output (daily average, tons)	74,045	74,513	195,072
Dodge building awards in 37 states (sq. ft.)	32,569,000	34,055,000	48,240,000
Automobile output	238,133	238,753	553,415
Coal output (tons)	22,195,000	26,745,000	26,041,000
Business failures; number	1,116	1,088	786
Business failures; liabilities	$20,106,000	$15,567,000	$8,906,000
Cement production (bbls.)		5,879,000	10,315,000
Cotton consumption (bales)	414,000	511,000	719,000
Car loadings (weekly av.)	531,604	555,716	738,810

Foreign Trade

	April, 1938	March, 1938	April, 1937
Exports		$275,711,000	$268,945,000
Imports		$173,405,000	$286,837
Gold exports		$20,000	$13,000
Gold imports		$52,947,000	$215,825,000

Financial Indicators

	April, 1938	March, 1938	April, 1937
25 Industrial stocks	$141.29	$144.54	$215.62
25 Rail stocks	$16.44	$18.54	$46.27
40 Bonds	$65.45	$67.50	$85.79
Bank clear'gs (000 omitted)		$22,822,000	$26,086,000
Commercial paper rate, New York (per cent)	1	1	1
*Commercial loans (000 omitted)	$8,587,000	$8,771,000	$9,428,000
Federal Reserve ratio (per cent)	82.6	80.5	79.7
Railroad earnings	†$14,470,444	$2,136,481‡	$69,379,328
Stock sales, New York stock exchange	17,119,534	23,000,335	34,613,169
Bond sales (par value)	$138,457,350	$169,194,455	$294,936,000

*Leading member banks Federal Reserve System.
†March, February and March, respectively.
‡Deficit.

Commodity Prices

	April, 1938	March, 1938	April, 1937
STEEL's composite average of 25 iron and steel prices	$38.61	$38.80	$40.39
U. S. Bureau of Labor index	*78.7	79.7	88.6
Wheat, cash (bushel)	$0.98	$1.05	$1.54
Corn, cash (bushel)	$0.73	$0.73	$1.43

*Estimated.

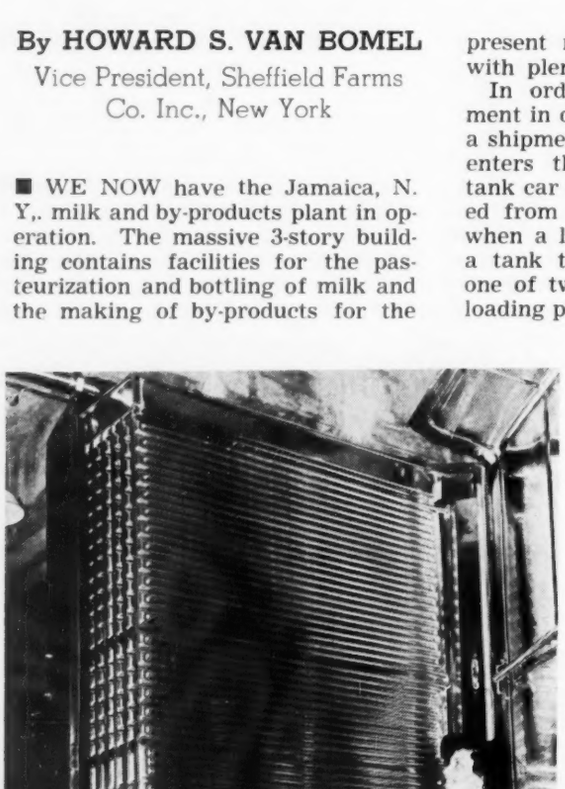
A Modern Milk Plant

New plant built at a cost of $2,500,000 utilizes much metal in special machinery and equipment. Much instrumentation and control is required. Because of sanitary and maintenance considerations stainless steel is used extensively for its resistance to corrosion

By **HOWARD S. VAN BOMEL**
Vice President, Sheffield Farms Co. Inc., New York

■ WE NOW have the Jamaica, N. Y,. milk and by-products plant in operation. The massive 3-story building contains facilities for the pasteurization and bottling of milk and the making of by-products for the present needs of all Long Island, with plenty of room for expansion.

In order to describe the equipment in orderly fashion, let us trace a shipment of milk from the time it enters the plant. On a railroad tank car shipment the car is unloaded from one of eight positions or, when a load comes in by means of a tank truck, it is unloaded from one of two positions. From the unloading platform the milk is pumped to the scale room on the first floor, where it is weighed in one of two 4400-gallon stainless steel storage tanks set on Fairbanks scales, each of which has a gross capacity of 50,000 pounds with 5-pound graduations. If necessary, the last few loads arriving at the plant can be stored in the two weigh tanks.



One of two stainless steel regeneratives. Warm milk leaving the pasteurizers under pressure heats the incoming cold milk and is cooled itself; the cold milk flows downward over the pipe-rack through which the warm milk travels

Pumped to Storage Tanks

After the weight has been checked, the milk is pumped to the storage tanks on the third floor. There are four horizontal stainless steel storage tanks of 4400 gallons capacity each. The raw milk shipment is now ready for processing and bottling and starts off by being pumped through DeLaval clarifiers. The clarifiers are similar in appearance to separators and similar in operation in that the milk enters the bottom of a chamber whirling at 6000 revolutions per minute, thus setting up a centrifugal force which throws the sediment out and downward to a collecting chamber, the cleaned milk passing through the outlet at the top.

After leaving the clarifiers, the milk flows over two parallel surface regenerative heaters. From the heaters it is pumped to a battery of seven Cherry-Burrell stainless steel spray vats of 550 gallons capacity each, where it is held at pasteurizing temperature of 143 degrees Fahr. for 30 minutes. The spray vats are filled and emptied in rotation and the timing is accomplished by means of Taylor controls and automatic valves.

The milk is then pumped out of the spray vats over two parallel Mojonnier stainless steel surface coolers. The heaters and coolers are similar in construction and are set back to back with circulating water pumps and controls in between. The complete heater-cooler

units with the water pumps are entirely enclosed in stainless steel covers. Each unit is over 18 feet long and stands slightly over 10 feet high. Recorders and controllers are placed on the center sections of these units.

After being cooled to 37 degrees the milk flows by gravity to a 500-gallon stainless steel filler supply tank in the filling room on the second floor. The tank is elevated to a point just above the level of the filler inlets so that we can continue the gravity flow from the coolers to the fillers. Four Mojonnier vacuum fillers are set in line and are fed by two Meyer bottle washers. The washers project just inside the filling room, each washer supplying bottles along stainless conveyors to two fillers.

Must Process Rapidly

Filling and capping operation takes place at the rate of 360 bottles per minute. Sweet cream is bottled on the same fillers. In order to supply the needs of the fillers, the pasteurizing equipment must be able to process at the rate of 48,000 pounds of milk per hour. The filled cases travel down through the filling room floor to the icebox on the first floor, at which point the cases are iced and conveyed to either the route platform or to the trucks.

In addition to the fillers for glass bottles, we have provision for filling paper bottles in the same filling room. Empty bottles and cartons are to be fed from the fourth floor down spiral chutes to the second floor to four American Can filling machines. Each of these machines fills at a rate of 70 bottles per minute. After 10 cartons have been filled, they are conveyed to the icebox on the first floor and distributed to either the trucks or route wagons.

Besides the milk operation, we have set up a by-products department which also can take care of the entire Long Island business. On the third floor alongside the pasteurizing room is a room, approximately 150 x 75 feet, which contains equipment for separating, cheesemaking, buttermilk, and butter. The chocolate drink is manufactured in a smaller room adjacent to the main by-products room.

Returned milk is pumped from the first floor icebox to a supply tank in the by-products room and from that point it is pumped through two Cherry-Burrell box-tube preheaters and through two DeLaval separators. The separated cream passes over a stainless surface cooler, just outside the icebox, where it is drained off in cans and immediately stored in the third floor refrigerator. The skim milk passes through a Cherry-Burrell plate heater and cooler, and flows either to the chocolate room, which has four 300-gallon stainless spray vats, or to one of five Jensen 1050-gallon vertical-coil stainless steel butermilk tanks, or to two Cherry-Burrell S. S. cheese vats. Both the chocolate and buttermilk tanks have direct sanitary lines to the by-products filling room on the second floor just behind the milk-filling room. The by-product filling room has two Mojonnier fillers for glass bottles and one American Can filler for paper.

Cottage cheese is made in two 1000-gallon stainless steel cheese vats in the main by-products room. Butter equipment consists of two stainless steel spray vats for pasteurization, one Von Gunten filter, Cherry-Burrell surface cooler, two Jensen 650-gallon vertical-coil stainless steel ripening vats, and a Creamery-Package 1000-pound churn.

Sweet cream is pasteurized in two 300-gallon stainless steel spray vats set in the milk pasteurizing room. Two Cherry-Burrell cabinet coolers, one for butter cream and one for sweet cream, are set on a mezzanine above the third floor. Space is also available for manufacture of sour cream and culture.

Heaters Protect Steel

■ Rusting of steel in storage has long been a problem in steel warehouses and in manufacturers' storage rooms. Recently it has been found that unit heaters installed in such areas, although not necessary for human comfort are valuable in eliminating condensation of moisture on the metals and resulting rust.

Value Indicated

Several examples indicate the value of unit heaters for this service. Two large storage rooms warehousing canned goods enroute to foreign countries on the docks at Vancouver, Wash., experienced much trouble from rust spots forming on the cans. Unit heaters suspended at several points completely eliminated this trouble by keeping the air dry.

Several steel warehouses in Portland, Oreg., and Seattle, Wash., recently have installed unit heaters to prevent formation of rust spots on steel stock in storage. In New York city a dealer in tool steel, stores more than five carloads in an unheated warehouse near the waterfront.

During the sudden changes in weather much trouble was experienced with moisture condensing on the steel. Installation of two gas unit heaters, turned on whenever the weather becomes warm, permits the sheets to warm up sufficiently to prevent condensation so that rust spots have been entirely eliminated in this warehouse.

More Room . . . More Fish

■ **All-welded steel hull of the PARAMOUNT tuna clipper allows her to carry 30 per cent more fish than she could if her hull had been of wooden construction. The clipper was built at Lake Washington Shipyards, Houghton, Wash. Six tons of General Electric electrodes were used in the fabrication of the 30 x 121-foot vessel. Her capacity for carrying fish in brine is 330 tons**

Pennsylvania Chapters of A.S.M. Meet at Penn State

■ A PROGRAM embracing papers on manufacture of large forgings, manufacture and testing of high pressure gas cylinders, production and uses of cold rolled sheets, and industrial research, attracted nearly 150 members of the American Society for Metals to the third biennial Pennsylvania inter-chapter meeting at State College, Pa., May 20-21. Chapters participating were the Philadelphia, Pittsburgh, Lehigh Valley, York, Penn State and Southern Tier.

The meeting was arranged with co-operation of the school of mineral industries, Pennsylvania State college, and embraced two technical sessions and a dinner-entertainment at the Nitanny Lion Inn. Edward Steidle, dean, school of mineral industries, and Prof. D. F. McFarland, head, department of metallurgy, and secretary of the Penn States chapter of the society, welcomed the visitors to the college.

Discussing the manufacture and properties of large forgings, A. O. Schaefer, engineer of tests, Midvale Co., Philadelphia, pointed out that production of sound ingots constitutes the most important single step. In this connection, he referred to the fact that the bulk of all steel for heavy forgings is made in Pennsylvania. Progress has advanced to the point where 450,000-pound ingots can be cast from almost any alloy and these given proper heat treatment. Ingots must be soaked completely before being raised to the forging temperature, and this sometimes requires 100 hours. Forging is an age-old art, and technique has improved principally in refinements, making it possible to work with more sensitive steels.

Pressing Improves Structure

Large forgings are made mostly in hydraulic presses. The first step, Mr. Schaefer stated, is to round up corners of the ingot with a series of squeezing operations, this beginning the columnar crystal formation. Uniform heating is essential for all operations. Hollow forgings, for pressure vessels, for example, are made by piercing the ingot and then forging it down on a mandrel beginning at the center and working toward the ends. Sometimes when length is great, the center bore is machined before the ends are worked down. All large forgings must be heat treated to produce good physical properties and it is now possible to liquid quench with good success.

A good rule to follow in heating, the speaker declared, is 1 hour per 1 inch of diameter, alloy steel requiring particular care in heating as well as cooling. Proof of a forging is its service, asserted Mr. Schaefer, and for that reason it must be free from defects such as surface seams and cracks. Usual tests include macro and micro examination and tensile tests, also periscope tests in case of hollow forgings. Special tests comprise hydrostatic, bend and impact tests.

Purpose of forging, the speaker declared, is not to put metal to shape—it would be simpler to cast to shape—but to perform hot mechanical work which improves the metal. Today's demands are not for larger sizes of forgings, they are for higher physicals. Wider sheets has created new demand for forged and hardened rolls.

Treating to Refine Grain

In discussion of the paper, a question was raised as to how grain refinement in the final product is obtained. Mr. Schaefer said this is accomplished by a series of up to three or four heatings and coolings, each time dropping the temperature and with the last heating slightly above the critical temperature. This is followed by a draw. Discussion also developed that extremely long shafts are forged one end at a time, the purpose being to keep size of the forgings within range of the heating furnaces. This practice, however, is being discontinued for high speed rotating shafts, the speaker said. Heating of the unforged end preparatory to forging may produce in the overlapping zone of the forged end a grain coarsening which can be removed only by further forging in this section.

A. G. Zima, International Nickel Co. Inc., Los Angeles, inquired as to why ingots for hollow forgings are not cast hollow. The reply was that shrinkage strains around the core are extremely high and may cause cracks. However, T. Holland Nelson, consulting metallurgist, Villanova, Pa., stated such practice is being used in Germany.

Industry has become research minded since the World war and at present is spending 250 million dollars a year in research channels, declared L. C. Conradi, technical research director, International Business Machines Corp., Endicott, N. Y., in discussing the what, why and how of this subject. He defined research as a studious inquiry to add to knowledge. If personnel is properly selected and adequate equipment is provided, projects for investigation never will be lacking, he said. The research department will pay dividends.

Five objects of research are: 1. Improvement of product; 2. improvement of manufacturing processes; 3. finding new processes; 4. fact finding and testing; and 5. development of specifications for materials. Mr. Conradi's company employs 300 in eight research departments. Equipment is complete and modern and the building is air conditioned.

Pointing to some of the results which his company has obtained through research, Mr. Conradi said through use of the spectograph in studying metals, good die castings are assured. Investigation to find the most suitable steels for screw machine parts has increased production in some cases from 38 to 100 per cent. In one machining operation, output was increased from 8 to 22 parts per hour through study of the operation. Subsequently, multiple spindle equipment was employed and production was boosted to 82 per hour. Difficulty was being experienced in machining electrical iron. By working with the mill on this problem, a heat treatment at higher temperature was worked out, and machining properties were made satisfactory.

Another instance the speaker referred to concerned the punching and forming of beryllium copper contacts. It was possible to produce only 15,000 parts per tool grind, but research showed that when the strip was cadmium plated prior to forming, production could be raised to 160,000 or more before tools required regrinding.

Manufacturing Gas Cylinders

In dealing with the history, manufacture and testing of high pressure gas cylinders, A. Floyd Whalen, metallurgist, Harrisburg Steel Corp., Harrisburg, Pa., emphasized the importance of the compressed gas industry. At present, 22 gases are compressed and distributed in cylinders. The industry, which is under regulation of the interstate commerce commission, was born in 1890, and owes its tremendous development largely to the fact that it has been possible to manufacture safe steel containers capable of withstanding tremendous pressures even under abuse.

Early cylinders, Mr. Whalen asserted, were made from 5-inch diameter lap welded pipe with a bottom welded in and the top necked down. The first seamless cylinders were produced in 1900 and were without

benefit of metallurgical control or stress relieving. Because they were made extremely heavy, few failures resulted. Heat treating was first applied in 1908, and through it cylinder walls could be made thinner without loss in strength. This resulted in increased gas capacity.

Two methods are employed in manufacturing cylinders; the one most widely used being to almost completely pierce a billet, then reduce the cylinder size by drawing. The second method involves the dishing of a circular plate. Specifications for steel to be used are established by the bureau of explosives and call for 0.30-0.35 carbon, 1.40-1.70 manganese, and 0.04-0.05 per cent maximum for both sulphur and phosphorus. The specifications on stresses, unchanged for many years, virtually rule out alloy steels. Corrosion is the enemy of cylinders and although stainless steel would solve this problem, price rules it out.

Cylinders Heat Treated

Following fabrication, cylinders are heat treated and quenched. If carbon in the steel is low, water is suitable for the quenching medium; if carbon is high, oil must be employed to prevent cracking. A standard sized tank contains about 200 pounds of steel.

Mr. Whalen described the exacting testing procedure which must be carried out and certified. Cylinders are filled with water and immersed in compression tanks filled with water. A specified pressure is exerted on the cylinder externally which causes a certain amount of water to be expelled from the cylinder. This is measured accurately on a leveling burette and its flow back into the cylinder observed as the external pressure is relieved. Readings must fall within close limits and instruments must be checked frequently using calibrated cylinders. Interstate commerce commission regulations require that cylinders in service must be inspected and tested every five years. This is a safety precaution since corrosion may cause cylinders to become dangerously weakened.

In written discussion of Mr. Whalen's paper, H. W. McCort, resident inspector, R. W. Hunt Co., Harrisburg, Pa., and E. C. Smith, chief inspector, Harrisburg Steel Corp., Harrisburg, Pa., stressed the importance of accuracy of gages used in the testing apparatus. Furthermore, the temperature of the water inside and outside the cylinders must be uniform. Mr. McCort referred to unnecessary abuse to which cylinders sometimes are subjected in users' hands. Charged cylinders carry pressures up to 2000 pounds, yet instances have been known where they were used as rollers in moving heavy machinery. Because the cylinders have thin walls and are easily dented, this is dangerous practice.

One speaker inquired if it is not dangerous practice to stamp serial numbers on cylinders. Mr. Whalen replied that these numbers are placed on cylinder necks where the metal is considerably thicker than in the walls, and in this location present no hazard.

Discussion developed the interesting information from R. L. Templin, chief engineer of tests, Aluminum Co. of America, New Kensington, Pa., that aluminum cylinders now are being manufactured for aircraft use. These cylinders, he said, are seamless, are made from one of the commercial aluminum alloys and display strengths of 68,000 pounds per square inch.

Better Sheets Demanded

Lighter gages, larger sizes, better physical properties and better finishes are among the demands which users of cold rolled sheets are imposing upon steelmakers in recent years, said Joseph C. Eckel, assistant manager of sales, sheet division, Carnegie-Illinois Steel Corp., Pittsburgh, in presenting a paper on cold rolled sheets and their applications. The matter of grain size is becoming more important and the requirements for severe forming have forced development of better heat treating practice. To provide the proper structures in their sheets, mills are exerting great care and control in their annealing, cleaning and drawing operations. Mr. Eckel emphasized the importance of physical, chemical and metalographic tests to make certain the finished product meets users' specifications.

Co-operation Is Sought

In a written discussion, W. F. McGarrity, Irwin works, Carnegie-Illinois Steel Corp., Pittsburgh, stated that irregularities in sheets must be minimized if good quality sheets are to be produced. This requires careful control in blast furnace and open hearth practice. Breakage in drawing operations can result either from characteristics of the sheets or improper dies, therefore, close co-operation between the sheetmaker and user is imperative. H. W. Graham, Jones &Laughlin Steel Corp., Pittsburgh, asserted that mills are attempting to set proper standards for sheets and some progress is being made.

Much of the discussion centered on the effect of aging and how stretcher strains can be eliminated. Mr. Eckel pointed out that roller leveling in fabricating plants just prior to deep drawing is advisable. When this can not be arranged, mill shipments should be scheduled so that the sheets can be used upon arrival. In the opinion of Mr. Eckel, the tendency of sheetmakers is to employ too high temperatures in their annealing practice and thereby they are contributing to grain growth, and subsequent trouble in drawing operations.

Powder Forms Cleaner

■ Puro Chemicals, Inc., Cleveland, is introducing a new cleaning material supplied in powder form for addition to water in cleaning metal surfaces. The material is made of an ordinary alkali cleaner and an additional agent to increase its effectiveness.

With Metals Society Members at Pennsylvania State College

Impact Testing Symposium To Top A.S.T.M. Annual Meeting Program

■ A SYMPOSIUM on impact testing will feature the forty-first annual meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall, Atlantic City, N. J., June 27-July 1. This symposium, arranged in co-operation with the welding research committee of the Engineering Foundation, will consist of two sessions with ten papers.

The last symposium on this subject was held in 1922 and since that time the impact test has gained wide usage. The present effort will be to present an integrated series of papers covering basic theories underlying the test, data on factors affecting impact, and practical applications of the test to metals, welds and plastics.

Other important sessions will deal with effect of feedwater on boilers; radiographic testing, in which field a new committee has been organized; and effect of temperature on properties of metals and fatigue. Many committees will make reports at regular sessions.

The formal meeting program will start on Tuesday morning, June 28, and will conclude Friday noon, July 1. To compact the program, several evening sessions are scheduled. A number of committee meetings will be held on Monday, June 27, and Thursday afternoon, June 30.

Lecture on Torsion Test

Dr. Albert Sauveur, professor emeritus, Harvard university will deliver the thirteenth Edgar Marburg lecture on the afternoon of June 29. His subject will be "The Torsion Test." Following this, the Charles B. Dudley medal will be awarded to Robert H. Heyer, American Rolling Mill Co., Middletown, O., for his prize winning paper, "Analysis of the Brinell Hardness Test," presented at the 1937 annual meeting.

Important details of the meeting program are as follows:

Tuesday, June 28

MORNING

Report of committee E-9 on research.
Report of committee E-10 on standards.
Report of executive committee, by C. L. Warwick, secretary-treasurer.
President's address, by A. E. White.
Introduction of new officers.

AFTERNOON

Water

Report of joint committee on boiler feedwater studies.
"A method for Embrittlement Testing of Boiler Waters," by Frederick G. Straub and T. A. Bradbury, University of Illinois.
Report of committee D-19 on water for industrial uses.
"Removal of Dissolved Salts from Water by Exchange Filters," by P. G. Bird, National Aluminate Corp.
"Determination of Sodium in Water Supplies by an Indirect Method," by J. B. Romer, W. W. Cerna and H. F. Hannum, Babcock & Wilcox Co.

Impact Testing Symposium

A—Basic Theory

"Theory of Impact Testing: Influence of Temperature, Velocity of Deformation, and Form and Size of Specimen on Work of Deformation," by D. J. McAdam Jr., national bureau of standards, and R. W. Clyne, American Steel Foundries.
"Stress-Strain Relations Under Impact Loading," by G. Datwyler and D. S. Clark, California Institute of Technology.
"Speed Effects in Tension Testing at High Speeds; Transition Velocity," by H. C. Mann, Watertown arsenal.

B—Present-Day Uses of Impact Testing

"Utility Impact Testing," by Sam Tour, Lucius Pitkin Inc.
Impact Strength of Plastic Materials," by Robert Burns and W. W. Werring, Bell Telephone Laboratories Inc.
"Practical Application of Notched-Bar Impact Test," by G. C. Riegel and F. F. Vaughn, Caterpillar Tractor Co.

EVENING

Impact Testing Symposium

C—Impact Tests on Welded Specimens

"Use of Charpy Test as a Method of Evaluating Toughness Adjacent to Welds," by Walter H. Bruckner, University of Illinois.
"Variable Speed Tension Impact Tests on Welded Specimens," by W. R. Warner, Watertown arsenal.
"Critical Review of Literature on Weld Impact Testing," by W. Spraragen and G. E. Claussen, welding research committee, Engineering Foundation.

D—Summary

"Impact Testing—A Summary," by S. L. Hoyt, A. O. Smith Corp.

Wednesday, June 29

MORNING

Radiography

Report of committee E-7 on radiographic testing.
"Radiographic Testing—Its Place in Industry," by H. H. Lester, Watertown arsenal.
"Secondary Radiation in Radiography of Aluminum, Steel and Lead," by Herman E. Seemann, Kodak research laboratories.
"Quantitative Gamma-Ray Radiography," by Gilbert E. Doan, Lehigh university.
"A Study of Intensifying Screens for Gamma-Ray Radiography," by Charles W. Briggs, naval research laboratory, and Roy A. Gezelius, Taylor-Wharton Iron and Steel Co.
"Correlated Abstracts Dealing with Radiography," by Victor Hicks, Westinghouse X-Ray Co. Inc.

AFTERNOON

Methods of Testing—Nomenclature

Report of committee E-4 on metallography.
Report of committee E-1 on methods of testing.
"Statistical Methods as an Aid in Revising Specifications," by N. C. Wiley, bureau of construction and repair, navy department.
"A Level Bubble Strain Gage," by Rex L. Brown, University of Illinois.
Report of committee B-4 on electrical-heating, electrical-resistance and electric-furnace alloys.
Report of sectional committee Z-23 on specifications for sieves for testing purposes.
Report of committee E-8 on nomenclature and definitions.

Marburg Lecture

"The Torsion Test," by Dr. Albert Sauveur, metallurgical engineer and professor emeritus, Harvard university.
Award of Dudley medal to Robert H. Heyer, American Rolling Mill Co.

EVENING

Effect of Temperature, Fatigue of Metals

Report of joint research committee of A. S. M. E. and A. S. T. M. on effect of temperature on properties of metals.
"Actual Grain Size Related to Creep Strength of Steels at Elevated Temperatures," by S. H. Weaver, General Electric Co.
"Temperature Measurement and Control in Creep Testing," by P. G. McVetty, Westinghouse Electric & Mfg. Co.
Report of research committee on fatigue of metals.
"Effect of Overstressing and Understressing in Fatigue," by J. B. Kommers, University of Wisconsin.
"An Investigation of Effects of Elevated Temperatures on Fatigue Properties of Two Alloy Steels," by J. S. Kinney, formerly at Rensselaer Polytechnic institute.
"Recent Developments in European Research on Fatigue of Metals," by Richard P. Seelig, Metal Powders Processing Co. Inc.

Thursday, June 30

MORNING

Steel, Ferroalloys, Corrosion

Report of committee A-9 on ferroalloys.
Report of committee A-1 on steel.
"Physical Properties of Four Low-Alloy High-Strength Steels," by W. L. Collins and T. J. Dolan, University of Illinois.
Report of committee A-10 on iron-chromium, iron-chromium-nickel and related alloys.
"Surface Cracks on Large 18 per cent Chromium, 8 Per Cent Nickel Alloy Steel Castings," by Peter R. Kosting, Watertown arsenal.
Report of committee A-5 on corrosion of iron and steel.
Report of committee A-6 on magnetic properties.
Report of sectional committee B-36 on standardization of dimensions and materials of wrought-iron and wrought-steel pipe and tubing.

EVENING

Iron

Report of committee A-2 on wrought iron.
Report of committee A-3 on cast iron.
Report of sectional committee A-21 on specifications for cast-iron pipe and special castings.
"Effect of Size and Type of Specimen on Torsional Properties of Cast Iron," by Jasper O. Draffin and W. L. Collins, University of Illinois.
"Notes on Hardness Measurements of Very Hard Steels and White Cast Irons," by J. T. Eash and J. S. Vanick, International Nickel Co. Inc.
"Properties and Uses of Chilled Iron," by S. C. Massari, Association of Manufacturers of Chilled Car Wheels.
Report of committee A-7 on malleable iron castings.

Fuels

Report of sectional committee M-20 on classification of coals.
Report of committee D-5 on coal and coke.

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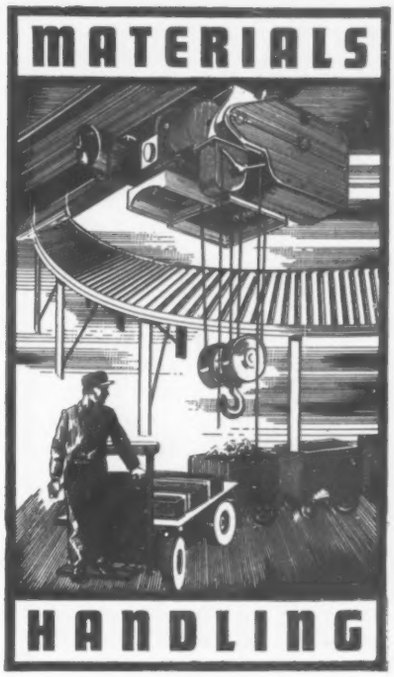

Interplant Shipping

Second part of article featuring unit-load handling shows how vendor-to-plant shipments afford equal opportunity for significant savings in handling costs

Part II

J. A. CRONIN, Materials Handling Editor

By M. H. CUNNINGHAM
General Electric Co.
Schenectady, N. Y.

■ ORGANIZING a good materials-handling program in conjunction with an outside vendor of raw materials is essentially the same as in the case where plant-to-plant shipments are involved. First the receiving plant must make a thorough study of the materials to be handled in order to plan the program for unit loads of certain sizes, weights, and shapes. Much as in the case of plant-to-plant shipments, the following factors should be seriously considered:

The receiving plant should determine the overall size and weight limits of the unit load to be received. Ease of handling before and after transfer, size of aisles and box car doors are typical of the aspects that must be considered in making such decisions.

Should Be Standardized

Pallets and containers should be standardized wherever possible—thus simplifying the shipping task of the vendor, simplifying unloading, and facilitating the return of the pallets and containers to the vendor after they have been received and unloaded by the plant.

It should be remembered that the unit loads to be most useful, ultimately must be delivered at the point of use in the processing line or in storage.

After the receiving plant has outlined its unit-load system on the basis of these considerations, the next problem is to interest outside vendors in the plan.

Experience of the General Electric Co. has been that vendors co-operate very satisfactorily when the mutual advantages of the plan are brought to their attentions. Furthermore, the unit-load method has resulted in an actual reduction of cost to the vendor, both in the use of less packing materials and sometimes in the entire elimination of bulkheads and bracings in box cars.

Another preliminary consideration is co-operation with the fork-truck, the steel-banding, and the wire-strapping companies. Such organizations as these can be of real assistance in formulating plans, and have proved willing to do so.

After contracts have been made with vendors, strapping companies, and fork-truck manufacturers, and an agreement has been reached, entire program should be laid out. Then receiving plant should make up drawings to cover each unit-load function under consideration. Such drawings should clearly illustrate method of shipping each type of material. Included in details should be construction of pallets for each type of material, and method of pre-

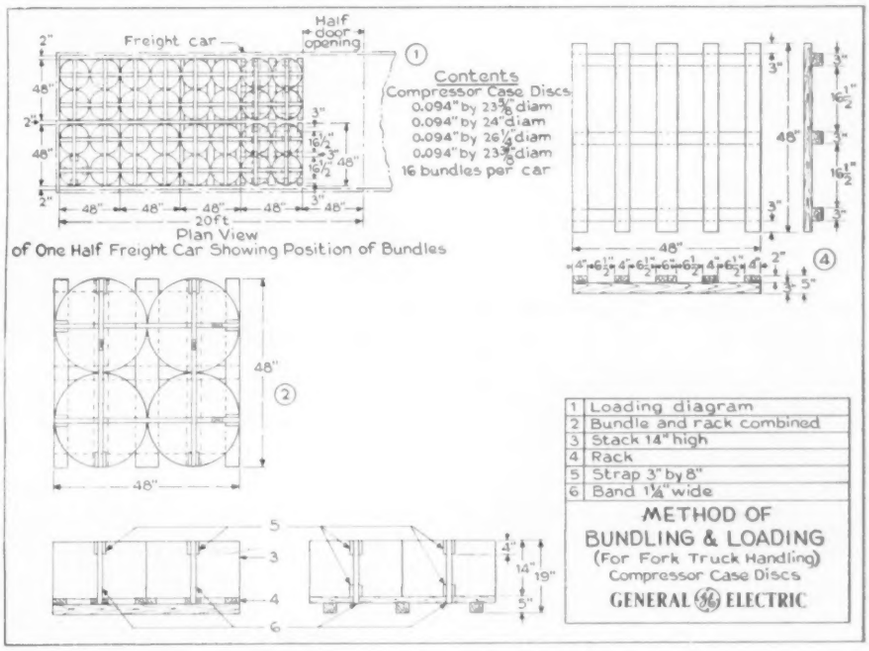

Fig. 9—Typical drawing to cover unit-load functions for acquainting vendors with details of shipping plan

Fig. 10 — Refrigerator disks as formerly handled in freight cars, a slow, wasteful, tedious job

paring the load by strapping or banding. If shipment is to be made in box cars, drawings also should indicate methods of car loading which will best lend themselves to economical unloading at the receiving plant. A typical drawing of this type, covering the shipment of steel refrigerator case disks from the vendor to the G-E Schenectady plant, is shown in Fig. 9.

By sending copies of these completed drawings to vendors, manufacturers can be assured that the

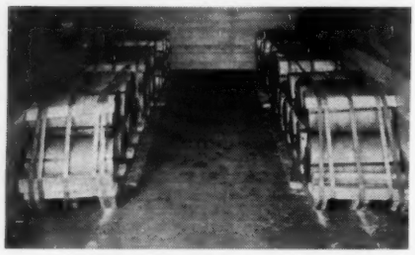

Fig. 11—Present unit-load method of loading refrigerator disks in a car

plan will be carried out exactly as contemplated.

Until unit-load methods were instituted for handling refrigerator case disks, loading as well as unloading was an expensive process. Disks were carted into the car a few at a time, and upon reaching their destination they were placed, one at a time by workmen, into a metal basket shown in Fig. 10, pulled out of the car and taken to their destination. There was much wasted motion involved in the individual han-

Fig. 12—Packaging and unloading of larger disks in refrigerator department of General Electric Co.

dling from car floor to container. Also, it was necessary to remove the container from the car by crude methods which required a subsequent handling before final transfer to place of use.

Present unit-load method used with this class of material employs a single-face pallet and a band-iron feature as in Fig. 11. Floor space is saved, blocking is almost eliminated as only strips of board nailed to the floor are necessary to assure safe transfer via box car. Larger disks require but slightly different packaging, as shown in Fig. 12, and

Fig. 13—Disks as they may be stored in same operation as that for unloading

are handled in exactly the same manner.

Both large and small sizes of disks are suitable for handling by fork-type trucks. This allows removal from cars in one handling operation, shown in Fig. 12. Fig. 13 illustrates how it is possible, as a part of the same operation, to carry the disks to their place in storage where they may be tiered or to de-

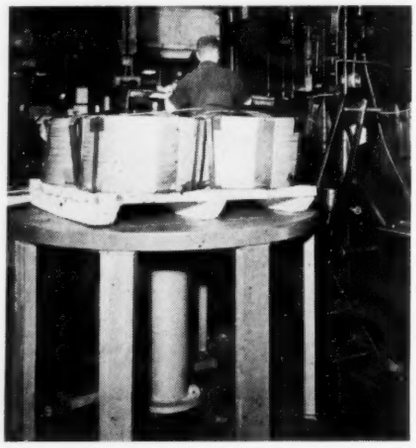

Fig. 14—Disks deposited in unit loads at point in processing line

posit the loads at their appropriate places in the processing line as in Fig. 14. The fork truck, by the way, may directly unload its cargo on a turn-table. This feature permits the operator to turn the table so package of disks which he is using al-

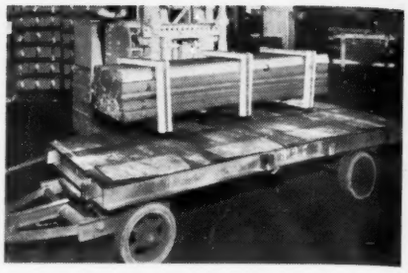

Fig. 15—Handling of steel strip stock simplified by convenient and economical method of packaging

ways will be in a convenient position for feeding units into the punch press.

Handling of strip steel presented a difficult problem for many years. It was a difficult product for vendors to load economically, and it was just as difficult for the receiving plant to unload and transport to the point of use. Study recently has led to the convenient and economical method of packaging shown in Fig. 15.

Aluminum in roll form also has

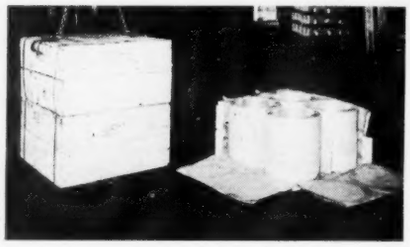

Fig. 16—Aluminum rolls as formerly handled, four rolls to the carton

presented difficulties. Not long ago these rolls were handled in boxes, each of which contained four rolls as seen in Fig. 16. Handling a box involved use of a crane. Today these rolls are handled by the unit-load method, and are transported from the box car to their destination in units of 27 rolls. See Fig. 17. Aside from direct economy in moving, less floor space is required.

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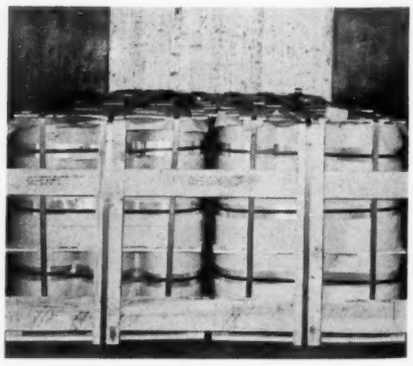

Fig. 17—Aluminum rolls as now handled, 27 rolls to the carton

...the new Greater Exide-Ironclad Battery

EXIDE now makes available to industry a series of Greater Exide-Ironclad Batteries, with abundant power to drive the largest electric material handling trucks continuously for twelve or more hours.

With standard assembly in steel trays of 15, 18, and 24 cells or more, the Greater Exide-Ironclad is available in sizes from 15 to 21 plates per cell —capacities of 700, 800, 900 and 1000 ampere-hours at the normal discharge rate.

Thus these batteries pack gigantic power into a minimum of space. The 18-cell, 21-plate battery, illustrated, has a capacity of 34.4 K.W.H.—41% greater than that of an 18-cell Type TLM-29 Exide-Ironclad, which is the largest size battery of the TLM Type that can be assembled in the same floor space.

The new Greater "MEH" Exide-Ironclad fills out the Exide line. As an additional battery to the MVM, TLM, and FLM types, it makes dependable and economical battery power available for every make and type of electric truck, from the smallest to the largest.

With the new Greater Exide-Ironclads, trucks of 30,000 lbs. capacity and more can be amply and economically powered for years to come. Two such batteries will keep the busiest truck in steady, 24-hour operation per day. This significant advance marks another mile post in the long path that Exide has been blazing for fifty years. Write us for full data on the Greater Exide-Ironclads.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

The World's Largest Manufacturers of Storage Batteries for Every Purpose

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High Cost Retards X-Ray For Castings Examination

Steel Castings

■ USE of radiography for exploration of defects in steel castings is looked upon with favor by some manufacturers. Presenting the report of the radiography committee, C. W. Briggs, naval research laboratory, Washington, explained that a questionnaire sent to 251 organized steel foundries brought 49 replies indicating that 19 companies use radiography and 39 per cent had studied the subject.

Approximately two-thirds of those replying stated they hesitated to use radiography on account of cost; others pointed out that incorrect interpretation of results was their reason for not installing equipment. Fourteen companies stated they would take orders for castings subject to radiographic examination; two said they would not.

The questionnaire revealed many cross currents of opinion. For instance, 37 agreed that they would use radiography to better their casting technique, 6 replying in the negative. Relative to reliability of radiographic examination, 12 were of the opinion that it was satisfactory, 18 replying that it could not be depended upon.

The speaker was of the opinion that certain specifications should be used in connection with radiography, but he cautioned that more study is necessary. He suggested another questionnaire in 5 years, but discussion favored another in a year or two.

Finds Radiography Profitable

J. R. Hewitt Jr., American Manganese Steel Co., Chicago Heights, Ill., stated that while x-ray equipment is expensive, it soon pays for itself. He mentioned that equipment installed at his plant cost $30,000 and involves a yearly operating cost of $2500. The equipment has been operated for a little over 3½ years. Before the equipment was installed about $50,000 annually was refunded to customers purchasing heat-resisting alloy castings. Last year the refund was less than $15,000. Radiography, he believed, was directly responsible for reduction in the amount of adjustments.

Ductility and impact values of steels vary inversely with the sulphur content, even with no aluminum addition. Furthermore, for any given aluminum addition, ductility is lower the higher the sulphur content. These facts were related by C. E. Sims and F. B. Dahle, Battelle Memorial institute, Columbus, O. in speaking on effect of aluminum on properties of medium carbon cast steel.

Effect of increasing sulphur, Mr. Sims stated, is greatest when aluminum content is that which gives lowest ductility. After recovery of ductility, effect of quantity of sulphur is practically the same as when no aluminum is used.

Aluminum Effect Varies

Fred Grotts, Lebanon Steel Foundry Co., Lebanon, Pa., citing tests conducted by a group of founders in the East, mentioned that physical properties of castings showed practically no variation whether 4 pounds of aluminum per ton was added or 4 to 6 ounces, or none at all. He emphasized that with high aluminum additions there is an absence of woody structures. In electric steel furnace practice much of the trouble centers around melting procedure. Heats have to be boiled and the carbon, silicon and manganese practically eliminated, he stated.

H. H. Blosjo, Minneapolis Electric Steel Castings Co., Minneapolis, mentioned an aluminum addition of 2 pounds per ton of metal as giving good results.

In presenting a committee report on methods for producing steel for castings, H. Phillips, Dodge Steel Co., Philadelphia, cited the most striking development in the electric arc furnace as the rotating hollow graphite electrodes as used by the Ludlum Steel Co., Watervliet, N. Y. He mentioned that cupola hot metal duplexing for electric steel foundries had been carried further and that there was a revival of interest in the converter process.

The speaker drew attention to the use of titanium to control the grain growth of medium manganese steels with results that yield strength and impact resistance are markedly increased with no loss in ductility.

A 5-zone continuous furnace for the heat treating manganese steel castings was stressed as the most important development during 1937 by D. C. Zuege, Sivyer Steel Casting Co., Milwaukee, and chairman of the committee on heat treating. He pointed out that this furnace has effected a fuel saving of 35 per cent over the batch type equipment formerly used and a reduction in oil consumption of 13 gallons per ton. A further saving was effected through reduction in scale.

The speaker drew attention to the fact that in those foundries producing medium and small steel castings there has been a trend toward greater use of double or triple heat treatments. Furthermore, in some instances, he stated, liquid quenched and drawn carbon steel castings have replaced normalized and drawn low alloy castings with equally good results and lower cost.

Flame hardening was mentioned as having made significant advances in 1937. In conclusion the speaker announced that his committee proposes to make a survey this year of types of heat treatment used, the degree to which each is employed, and results obtained.

Calcium Improves Impact

Advantages of calcium as a deoxidizer were outlined by A. P. Gagnebin, International Nickel Co. Inc., Bayonne, N. J., who pointed out that calcium is able to maintain sulphide dispersion in the presence of aluminum. Drastic increase in the impact value was obtained by use of calcium. The addition of this element, however, had no effect on the ductility. The speaker drew attention to the fact that calcium must be added to the melt under a slightly oxidized condition, the most efficient practice being to force this deoxidizer into the melt. Addition of aluminum and calcium in combination produces a higher yield point than when aluminum is used by itself as a deoxidizer.

Under certain conditions it is impossible to design a casting so that prominent hot spots are eliminated, and, since excessive temperature gradients will be present, it becomes necessary to relieve the major stresses resulting therefrom by some other means. That the foundryman has at his command a method to reduce these stresses by employing mold relieving principles was brought out by C. W. Briggs, naval research laboratory, Washington. Mr. Briggs spoke on "Steel Casting Design for the Engineer and Foundryman," which was prepared by himself, A. R. Donaldson, also of the laboratory and R. A. Gezelius, Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

The designer also can aid toward

ADDITIONAL reports of technical sessions held during the forty-second annual convention of the American Foundrymen's association in Cleveland, May 14-19, are presented on this and succeeding pages. A number of sessions were reviewed in STEEL last week; others will follow shortly

producing a more stress-free situation by designing an intricate casting in two, three or more parts, and the speaker suggested that these finally could be assembled by joining the various cast parts by welding or bolting.

The speaker directed attention to the fact that models of the original design are helpful to both designer and foundryman, inasmuch as necessary changes can be pointed out. After the foundryman has obtained a workable design, he can use the tools at his command, such as tapered sections, proper gating and heading, chills, relieving blocks, to preclude the possibility of shrinkage cavities and hot tears.

Cost Influences Design

Discussion at the steel division roundtable luncheon conference centered around the design of steel castings, converter steel castings and the cement mold process of making molds for steel castings. On the subject of designing castings properly before they enter the foundry, a member claimed that the foundryman is handicapped in any conference by two factors which predominate in the minds of the other conferees, quality and cost, not the ultimate cost which the foundryman clearly can envisage, but the immediate cost. For example, on blank gears instances were cited where efficient risers would produce solid castings, but objection to their use was encountered on the ground of the excess metal and in some instances the excess machining.

Discussing the decline of the converter as a steelmaking unit, it was pointed out that conditions now are different from those prevailing several years ago and that a distinct renaissance is noticeable in quickening interest in this type of steelmaking unit. Several speakers declared that the converter is as competent as any other medium for producing high class steel.

Materials Handling

■ Modern foundries have outgrown sand and shovel days and have turned to all types of materials handling equipment to keep production costs low. Installation of this equipment, which is sometimes complicated in nature, has brought with it a new problem—that of maintaining it in working condition to forestall expensive shutdowns. This subject was discussed by W. Carter Bliss, Scullin Steel Co., St. Louis, who pointed out that in this plant foundry equipment must function 24 hours a day.

The speaker stressed the importance of carrying on hand spare parts and other supplies so that replacements can be made speedily. An efficient master mechanic should have direction of all repairs. He described a new blast cleaning process recently installed in the Scullin plant, wherein the room is open at both ends and operators with the blast nozzles are stationed outside away from all dust. As the castings are conveyed through the blast chamber, the operators direct the blast through glass windows.

Must Prevent Breakdowns

In discussion, H. L. McKinnon, C. O. Bartlett & Snow Co., Cleveland, pointed out that conveying equipment should be sufficiently heavy to withstand reasonable overloads. On the subject of belt conveyor rolls, J. B. Silver, Palmer-Bee Co., Detroit, stated that the number should not be excessive in order to minimize maintenance. Mr. Bliss advocated a sufficient number of shear pins in conveying mechanisms so that a stalled unit will shear the pin and eliminate an expensive breakdown.

Presenting a paper on conveyors, Mr. Silver stated that because various materials present different problems, equipment should be selected to meet the specific needs. In this selection, the maintenance problems must be carefully considered.

A. F. Anjeskey, Cleveland Crane & Engineering Co., Wickliffe, O., contributed a paper on handling molds and castings in the small foundry with overhead equipment. In producing a ton of castings, he said, it is necessary to handle from 25 to 100 tons of materials, hence the necessity of adequate equipment to keep production costs low.

Malleable Iron

■ Production of fully annealed malleable iron in a cycle of approximately 14 hours was described in a paper by W. D. McMillan, metallurgist, McCormick Works, International Harvester Co., Chicago. Silicon is higher than in the usual type malleable iron—about 1.73 per cent—with carbon 2.20 per cent. Two factors operate to shorten annealing time, the higher silicon content which promotes graphitization and the high percentage of net metal in the annealing furnaces made possible by the elimination of heavy annealing pots.

This short cycle malleable iron shows a tensile strength of 55,000 to 60,000 pounds per square inch with an elongation of 15 to 20 per cent. The yield point is approximately 44,000 pounds per square inch. Mr. McMillan claimed this type of malleable should prove of general interest because of the lower annealing cost and high tensile properties.

General conclusions drawn by Duncan P. Forbes, president, Gunite Foundries Corp., Rockford, Ill., in a paper on spheroidized pearlitic malleable iron indicate that after the massive cementite has been completely decomposed by prior heat treatment, the limit of solubility of combined carbon in austenite in the presence of temper carbon is increased with higher temperatures. A variation in the manganese content of the material has little if any effect on the limit of solubility of combined carbon in austenite in the presence of temper carbon.

The combined carbon percentage remaining in the material after the spheroidizing operation is increased with higher percentages of manganese. The combined carbon percentage remaining in the material after the spheroidizing treatment is not affected greatly by the temperature in the austenitic range from which the material was air cooled. With increased combined carbon content, or with increases in manganese—the cause of increased combined carbon content—the ultimate tensile strength and the yield strength are increased while the percentage of elongation is decreased.

Hardening by Induction

In a paper, "Pearlitic Malleable-Tocco Hardened," W. E. Benninghoff, Ohio Crankshaft Co., Cleveland, described equipment and process for surface hardening pearlitic malleable iron castings. Surfaces to be treated are heated electrically and then quenched with a water spray. On account of the rapidity of the process, heating does not affect grain growth. With proper equipment, the speaker asserted a workman can treat 60 crankshafts per hour.

A. L. Boegehold, General Motors Research Laboratory, Detroit, described in a paper experimental work in determining the shortest practical annealing cycle for two production castings, a small one and a large one. H. A. Schwartz, National Malleable & Steel Casting Co., Cleveland, discussing the paper pointed out that primary graphitization ratio remains about the same even though heating rates change. That is indicated by completion in 1 hour for light sections and 5 hours for heavy sections at 1700 degrees Fahr. after slow heating. With rapid heating the times are 4 hours and 25 hours respectively, or about 4 and 5 to 1.

H. Bornstein, Deere & Co., Moline, Ill., said he found best results for short cycle annealing were obtained by placing the castings in a cold furnace, and raising to 1350

degrees Fahr., holding for a short time, and then running the temperature up to around 1700 degrees. R. J. Cowan, Surface Combustion Corp., Toledo, O., stated some experimental work indicated grain size might have considerable to do with annealing of malleable iron. Test sprues poured at different periods of melting when annealed together showed different structures. Also when specimens were held for 20 hours at 1000 degrees, first stage graphitization was complete in 2 hours as compared to 15 hours in samples which did not receive a holding treatment.

A paper by E. G. de Coriolis and R. J. Cowan, Surface Combustion Corp., Toledo, O., discussed atmosphere control in annealing malleable iron. According to the authors, a wide range of gas compositions is available to prevent or retard decarburization, and to reduce annealing time. In addition, a theoretical curve representing the demarcation between carburizing, decarburizing, and decarburizing and surface oxidation zones was presented with curves from furnaces operating with controlled atmospheres to show the close similarity.

Silicon Affects Annealing

H. Bornstein in the discussion presented some curves which agreed with those of the authors. He pointed out that he had found that there is little difference obtained with atmospheres containing a ratio of 3 parts of CO to 1 part of CO_2 and those containing 2 parts CO and 1 part CO_2. Consequently, in his furnace the atmosphere is maintained at the 2 to 1 ratio throughout. He was of the opinion that change of silicon content has a more important effect than change in atmosphere.

Mr. de Coriolis replied that the latter was true, but in the paper the idea was to consider effect of annealing on surface conditions of the castings. A question was asked on the effect of employing a carburizing atmosphere, and it was stated that with the comparatively high carbon content of malleable, it would be difficult to obtain such an atmosphere. Also, the possibility exists that graphitization might not proceed as desired.

H. H. Harris, General Alloys Co., Boston, contributed a paper on the role of heat resisting alloys in short cycle malleablizing furnaces. He described some of the problems encountered, and the newer types or designs of castings available for such applications.

Discussion at the malleable iron roundtable luncheon was confined to further consideration of certain points raised in a paper presented previously by Mr. Boegehold. In this paper it was stated that an investigation conducted by the author a number of years ago to determine the shortest time cycle for annealing iron disclosed among other things that teaching of literature in some respects did not apply.

Discrepancies to some extent may be due to the fact that the iron under investigation is melted in a cupola and then transferred to a direct arc electric furnace and heated to casting temperature. Average analysis was: Silicon, 1.15 to 1.20; carbon, 2.70 to 2.75; manganese, 0.38 to 0.42; phosphorus about 0.05; and sulphur 0.09 to 0.11 per cent.

Results showed the usually accepted idea that large temper carbon spots always are associated with heavy sections is not always correct. By heating to the primary graphitization temperature at a slow enough rate, the temper carbon spots in a heavy section may be as small and numerous as those in a light section, thus removing any relationship between as-cast structure and temper carbon distribution. Fast heating to the temperature for the first stage graphitization causes larger and fewer temper carbon spots than when heating is slow.

Difference in size of temper carbon spots as a result of fast and slow heating is more pronounced in heavy sections. The temperature range in which gamma iron, alpha iron and cementite exist simultaneously when heating at 100 degrees per hour is from about 1425 to about 1525 Fahr., compared with the published equilibrium diagram of 1380 to 1410 degrees Fahr. for this range. Complete elimination of pearlite in the second stage annealing may be accomplished at 1360 degrees Fahr.

Job Evaluation

■ The foundry industry is finding job evaluation becoming more and more important, consequently one of the management sessions was devoted to this subject. Speaking on job evaluation for the smaller foundry, E. L. Roth, Motor Castings Co., Milwaukee, said that for finding a fair rate of pay and for establishing understanding with workmen, the validity of job evaluation is unquestioned.

Considering the situation in 1937 when skilled workers were receiving a fairly uniform wage in different shops and the minimum rate in most shops in the same locality was consistently close, the speaker said there was, however, a large group of workers between the top and bottom wage rates who were receiving greatly divergent rates of pay for the same type of work. Mr. Roth cited the worth of job evaluation in the above situation and also as a help to the industry as a whole in properly allocating wage expenditures and allowing foundrymen to continue to compete with makers of stampings, welded products, etc.

Mr. Roth set forth the method as comprising 41 classifications coming under five departments, namely: Molding, core, cleaning and shipping, melting and miscellaneous. He explained the use of 15 factors which are given a per cent value and then are multiplied by the weight given that particular job, and added up to yield the point value of the job. This point value is applied to a chart with a determining line from minimum to maximum wage rate which reveals the wage rate for that job. No originality for this method was claimed by Mr. Roth.

Explains Rating Plan

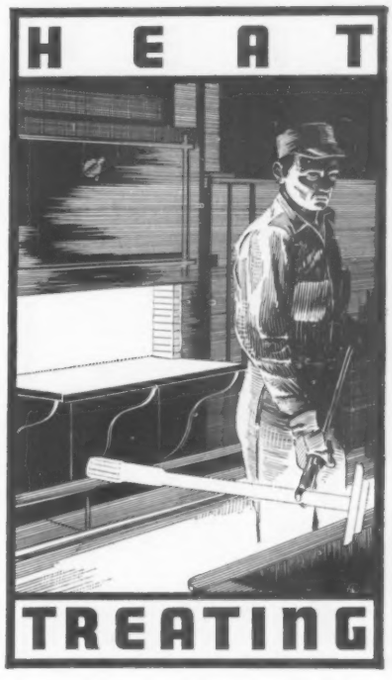
R. R. Landes, Western Electric Co., Chicago, and director of study and research, Industrial Management society, Chicago, gave an interesting demonstration of the occupational rating plan of the society. He said management must be able to demonstrate to workers why one job pays more than another and that the simplest way would be to list all classifications of jobs from the least to the most important. Another method cited was to study each job carefully and then categorize or pigeon hole the individual job.

In contrast Mr. Landes set forth the Management society method of employing the four main classifications of skill, responsibility, working conditions and physical requirements. These classifications are in turn broken down into 22 factors which are given as: Dexterity, precision, versatility, adaptation period, ingenuity, schooling, initiative, judgment, knowledge of equipment, methods and materials, responsibility for equipment, materials and safety of others, supervision received, discomfort, health and accident hazard, clothing spoilage, acuteness of senses, strength and endurance.

Handbook Is Revised

■ A revised edition of the South American handbook has recently been released by H. W. Wilson Co., 950 University avenue, New York.

The handbook is laid out to give the trader a complete picture of each separate republic in Latin America from Mexico to Tierra del Fuego in the south. It also contains interesting and useful information for the ordinary traveler. The book sells for one dollar and may be obtained by addressing the company.



Carburizing Ring Gears

Continuous gas carburization of automotive gears, although offering higher production and cleaner shop conditions, necessitates careful study of operating procedure

By T. A. FRISCHMAN
Chief Metallurgist
Axle Division, Eaton Mfg. Co.
Cleveland, O.

■ CARBURIZATION of automotive ring gears is one of the most exacting applications for the continuous type gas carburizing furnace. Standards for surface condition, hardness and case depth are very high, principally because gear teeth with few exceptions are merely lapped instead of ground. Where grinding is employed more metal is removed and greater latitude in surface imperfections is permissible. Thus in gear manufacture it becomes essential to prevent the slightest decarburization, coke deposits, scale or pits.

In February, 1937, the Axle division of the Eaton Mfg. Co., Cleveland, placed a continuous gas carburizing furnace in operation on a production basis. Although some difficulty was experienced at first, subsequent performance overbalanced the original shortcomings that required solution.

Essentially the equipment consists of furnace, muffle, DX or carburizing gas generating unit, trays, pusher mechanism and control instruments. Fig. 1 shows this equipment as installed in the Eaton plant. Burners over and under fire the muffle where carburizing takes place. Double doors at each end of the furnace prevent infiltration of air when the inner door is opened. The inner doors opening into the muffle are really valves sealing the muffle between the intervals when the work is pushed ahead and discharged.

Muffle of this furnace is 19½ feet long and has three integrally cast rails on which the trays of work travel. We use the 2-piece tray which is more suitable for our work than the single full-width tray commonly used. Furnace is fired with natural gas and is divided into three zones, all automatically controlled. The fourth zone or discharge vestibule, which is independent of the muffle and beyond the hot valve, is likewise automatically controlled.

Carburizing gas is a mixture of raw natural gas and a diluent gas prepared by burning raw natural gas in a DX or gas generating unit. While it is possible to vary the proportion of these gases as well as their rates of flow and still maintain proper case depth, our experience has been that rather close limits must be maintained to guarantee work which will meet the standards of cleanliness we require. Maintenance of these close limits, however, is relatively simple since proper controlling devices are part of the equipment.

Four inlets are provided for admission of the carburizing gas into the muffle. The first is at the cold valve or inner charge door and the remaining three inlets are spaced along the top of the muffle. Under our conditions of operation, best results as far as cleanlines and freedom from coke deposits are concerned are obtained by using only the three top inlets and proportioning the gas differently for each inlet. The proportion of raw gas to diluent gas decreases progressively toward the discharge end of the muffle.

Other factors remaining constant, control of the process is governed by the composition of the diluent gas. Of course, a reasonable latitude in composition is permissible

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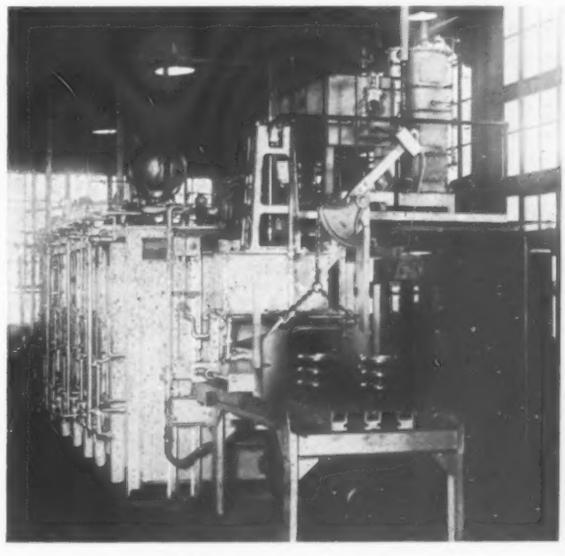
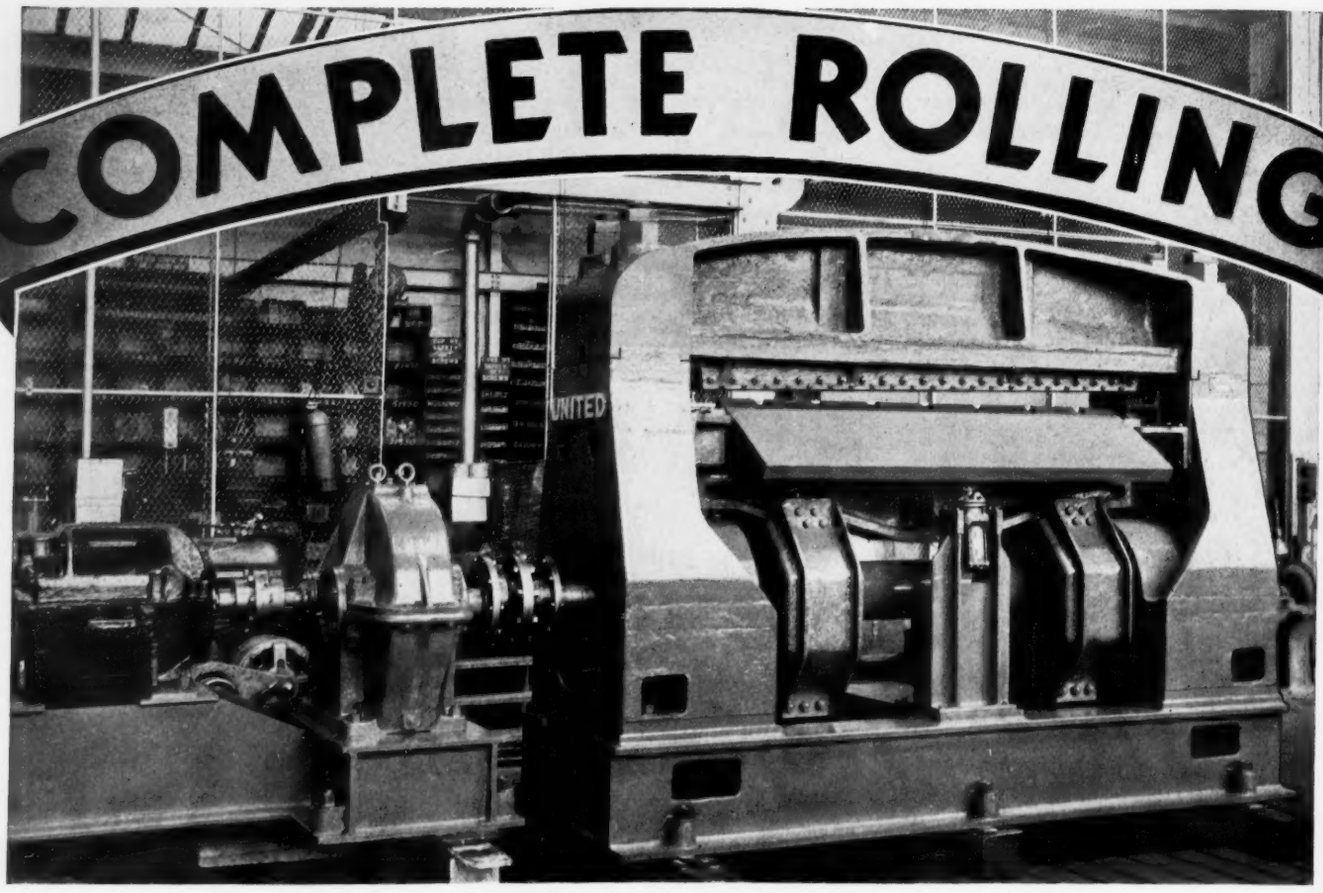
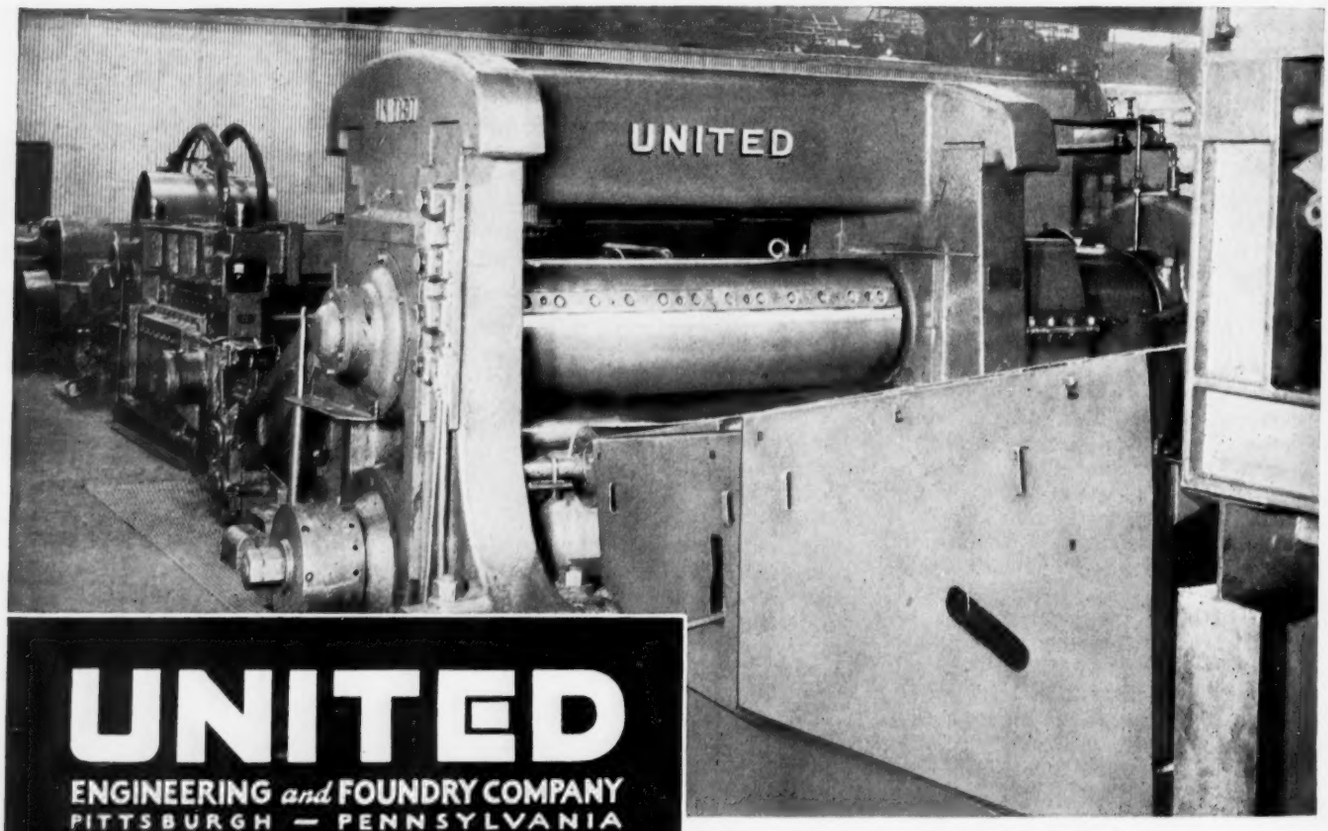


Fig. 1—Continuous gas carburizing furnace at Axle division, Eaton Mfg. Co., Cleveland, showing loading end in foreground, DX unit above. Photo courtesy Surface Combustion Corp.

COMPLETE ROLLING



98" Upcut Shear for Strip

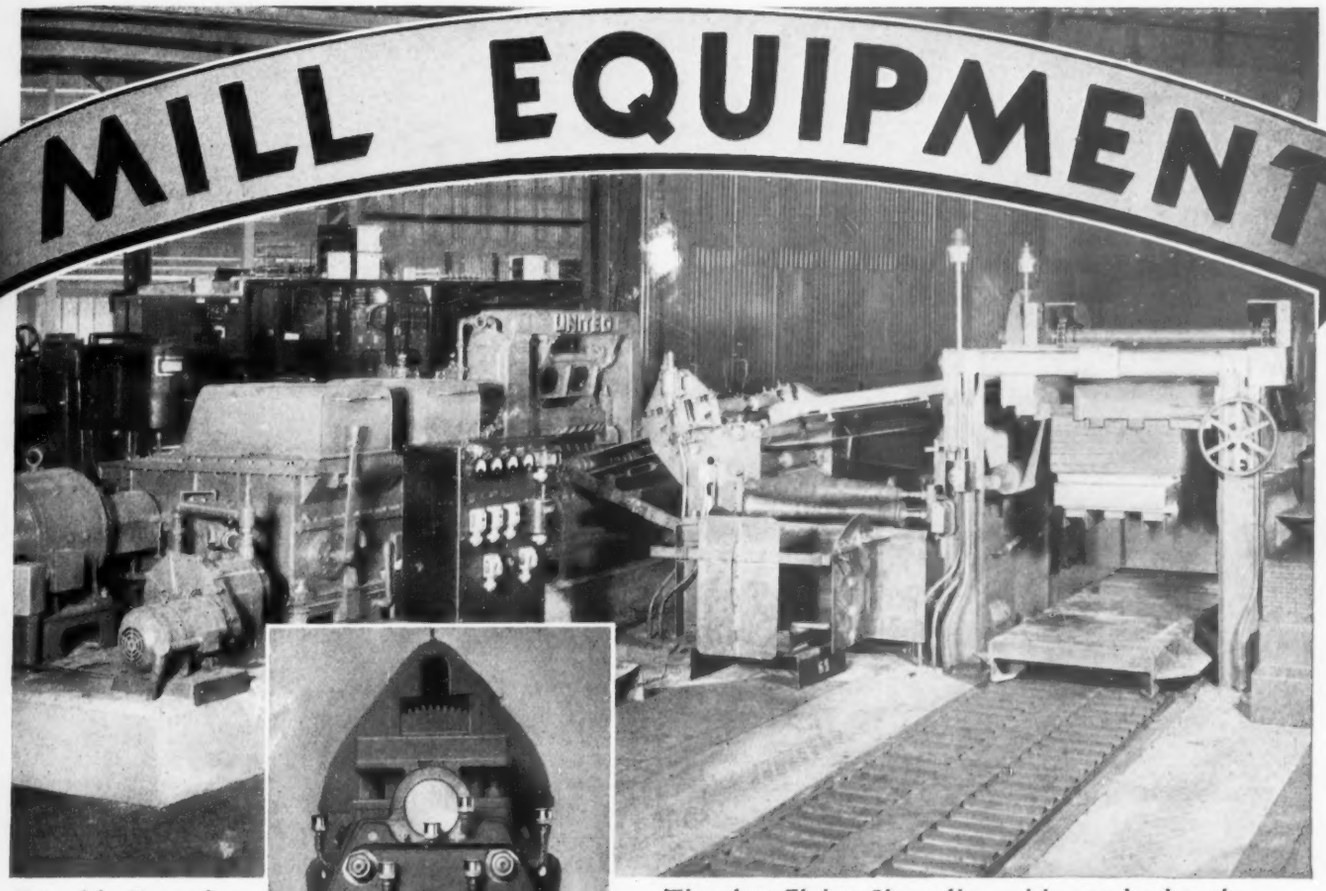


Drum type Flying Shear line

UNITED
ENGINEERING *and* FOUNDRY COMPANY
PITTSBURGH — PENNSYLVANIA

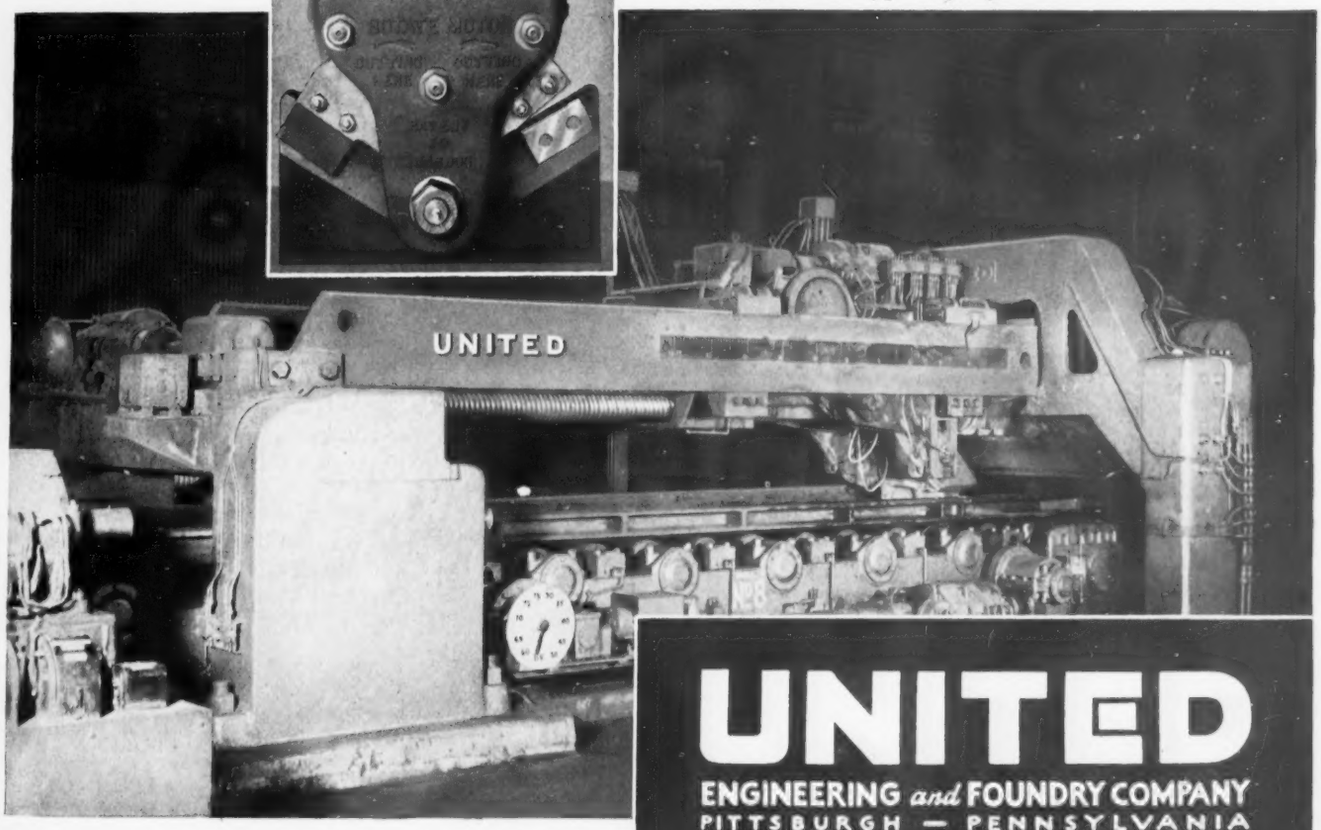
ASSOCIATED COMPANIES: DAVY AND UNITED ENGINEERING COMPANY, LTD., SHEFFIELD, ENGLAND — DOMINION ENGINEERING WORKS, LTD., MONTREAL, P. Q.

MILL EQUIPMENT



Portable Cropping Shear

Tin plate Flying Shear line with standard reciprocating crank type Flying Shear and Classifier



Down and Upcut Shear for Blooms and Slabs

UNITED

ENGINEERING *and* FOUNDRY COMPANY

PITTSBURGH — PENNSYLVANIA

ASSOCIATED COMPANIES: DAVY AND UNITED ENGINEERING COMPANY, LTD., SHEFFIELD, ENGLAND · DOMINION ENGINEERING WORKS, LTD., MONTREAL, P. Q.

Symposium Reviews Steelmaking As Practiced in Great Britain

■ PRINCIPAL feature of the annual meeting of the British Iron and Steel institute in London, May 4-6, was a symposium on steelmaking embracing 24 papers reviewing practice in Great Britain. Sections of the symposium covering refractories, fuels, furnace design and control, and basic steelmaking, were summarized in STEEL for May 23, page 46. Remaining sections, dealing with basic steelmaking furnaces, acid steelmaking, and application of physical chemistry to steelmaking, are abstracted herewith.

The subject of tilting furnaces was introduced by A. Robinson, Scunthorpe, Lincolnshire, who mentioned that the original tilting furnace, built many years ago, was still working and giving satisfaction. Present practice is to use refined iron and steel scrap. There are today 36 tilting furnaces of various capacities up to 300 tons and giving a wide variety of products. Tilting furnaces are satisfactory in Great Britain for the use of domestic ore, which is of relatively low grade and has a high percentage of phosphorus.

Refining in Tilting Furnaces

Tilting furnaces can really be considered as refining furnaces, and among other advantages are: Easy slag removal; and tapping steel partly or wholly as and when wanted. These furnaces given quick slag formation, with consequent economy in slag-forming materials. In 24 out of the 28 furnaces described, the practice is quite normal, some variations occurring in regard to the other four furnaces— one, for instance, at Port Talbot, using full coke-oven gas. At the Hadfield works in Sheffield there is a small tilting furnace used for manufacture of high-grade special steels.

Discussion on this group of papers was initiated by Benjamin Talbot, inventor of the Talbot tilting furnace, who stated that the cold process of steelmaking is practically only used when blast furnace metal is not available. He stressed the point relative to the loss of time which occurs in charging, and expressed the opinion that the pressing of scrap should be more widely used. Referring to the tilting furnaces, he said that he originated the continuous process a number of years ago and found that it would not be successfully applied with fixed furnaces; he therefore evolved the tilting furnace, in which he used flared sides. He started with a furnace of 75 tons, and saw no reason why they could not be built up to 400 tons capacity.

During discussion, it was stated that a high proportion of scrap can be used to improve the metallurgical burden and better to dilute the phosphorus. It was also said that in hot metal practice scrap should be as low as possible, and that the main object is to obtain a routine as uniform as possible. Improvements would result if more attempt was made to standardize the size and weight of materials in the charges. One statement was made to the effect that much can be learned from the early pioneers, because certain processes which failed in the earlier years probably did so through lack of the facilities which are available today. J. H. Whiteley, Consett Iron Co. Ltd., Consett, Durham, referring to a statement made in regard to the unfavorable influence of phosphorus, said that it is easier to make steel satisfactorily with basic iron than with non-phosphorus iron.

Frank W. Harbord, past-president of the institute, stated that fixed furnaces can be used in hot metal practice, and he would like to see a comparison between fixed and tilting furnaces as regards economy of production. He mentioned existence of two shops where the two types of furnaces are used under the same conditions. In reply, one speaker said that among the advantages of the tilting furnace was that relative to labor costs, which are substantially lower in the case of tilting furnaces. It was also stated that refractory costs are lower, and that the tilting furnace gives from 1 to 2 per cent better yield. A speaker said that the tilter will make plain carbon steel better than the fixed furnace, but that for special alloy steels and steels of narrow specification, the fixed furnace appears to be better.

Emphasizes Temperature Control

Papers on acid steelmaking were introduced by T. M. Service, William Beardmore & Co. Ltd., Glasgow, who made special reference to a paper presented in the Sheffield group of papers emphasizing the importance of control of temperature and of the effect of temperature, also the importance of oxygen content during working of the charge. A paper was also received from the Glasgow district indicating practice in that region. In that paper, two types of charges are given, one with low manganese content, the other with high manganese. It was stated that the higher manganese iron gives more fluid-working slags of lower FeO content and cleaner steel; it also permits closer control of the carbon drop to the required limits.

In discussion, Dr. W. H. Hatfield, Brown-Firth Research Laboratories, Sheffield, said that he had always thought that the fundamentals of open-hearth furnace practice had not been arrived at because of the fact that no quantitative analysis of the oxygen had been arrived at, and also because of the lack of precise determination of temperature in the bath. Now that such determinations have been made by Dr. T. Swinden, director of research, United Steel Companies Ltd., Sheffield, the speaker expressed the hope that before long open-hearth steelmaking would no longer be an art, but a science.

Dr. Hatfield showed a film illustrating the making of a 400-ton ingot, for which it had been necessary to tap three furnaces, and he explained the way in which the working of those furnaces had to be absolutely synchronized to arrive at a satisfactory result.

Slag Control Important

Prof. R. Hay, Royal Technical college, Glasgow, introduced the subject of "Some Aspects of Slag Control in Melting Practice," which subject was developed in a paper of the Glasgow group prepared by Prof. Hay, Dr. J. M. Ferguson and Dr. J. White, of Glasgow. The paper stressed importance of the part played by the slag in open-hearth steel practice. It stated that much information is still required on the constitution of slags and on the degree of dissociation undergone by the various components at steel-furnace temperatures. The part played by the slag in the transference of oxygen to the metal bath, and the influence of various substances upon this transference, require elucidation. Quantitative data are also required upon the equilibria of sulphur and phosphorus in the slag and metal.

Dr. A. McCance, Glasgow, summarized his contribution to the symposium in "Application of Physical Chemistry to Steelmaking," the exposition of the subject being mainly concerned with the development of the application of physical principles to chemistry since the discovery of the law of mass action by the Norwegians Guldberg and Waage in 1867 until the present day. The principal points dealt with in the paper were: Reduction of oxides by carbon; manganese reaction; silicon reaction; manganese-silicon reaction; sulphur reactions; ingot cracking; and phosphorus reactions.

Dr. Desch referred to Dr. Mc-

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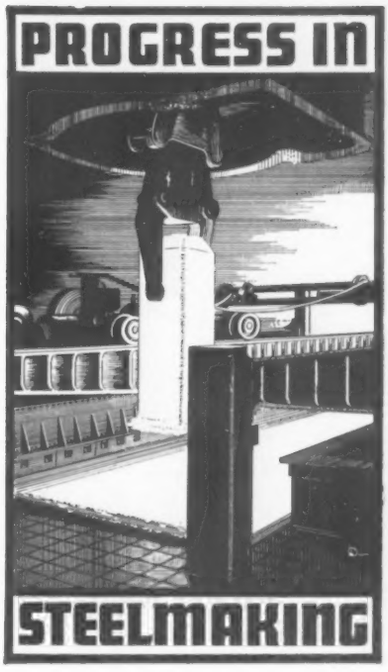


Reheating Furnaces

New furnaces under automatic pressure control are extremely flexible, make record of each heat, provide close control and reduce fuel costs by one third. Chipping costs also cut

■ EARLY this year three oil-fired, 4-door, batch-type heating furnaces were put into service by Rotary Electric Steel Co., Detroit, heating ingots subsequently rolled in a 28-inch, 2-high mill to billets varying from 2½ to 5 inches square.

Ingots to be heated are from 13½ to 14½ inches square and 70 inches long, over the hot top, weigh from 1 to 1½ tons and range from low carbon to high carbon and alloy steels. Production rating is three

Automatic control makes complete record of each heat

tons per hour per chamber. About 75 per cent of the steel is charged hot and remainder cold. To provide flexibility, each furnace is divided into two separately fired and controlled chambers, 9 feet deep and 16 feet long with two doors, each 5½ feet wide. Five ingots may be charged through each door, making 10 ingots to a chamber.

Each chamber is fired at one end by three oil burners. Waste gases are removed from the furnace just above the hearth level at both ends. Waste gas downtakes from each end of the furnace are controlled by dampers. Quantity of gases removed from end of furnace opposite burners is controlled by a manually operated stack damper, set so almost all the gases leave through this flue at the "holding" rate of firing. As the firing rate is increased, pressure in the furnace tends to increase and the automatic pressure control begins to open damper in flue leading from waste gas ports under burners.

Furnace is under automatic pressure control at all times, and gases are made to cross the hearth at low firing rates. This method of control produces uniform temperature over the entire hearth.

Thermocouple for temperature control is located in the backwall of furnace, about 3 feet above hearth level. As shown in accompanying illustrations, the power unit is connected by a rod to the three burners so all are turned up or down simultaneously. Thus they distribute heat evenly from front to back of furnace.

Oil is circulated continuously in a loop around the three furnaces, "make up" oil only being added. Each group of three burners is on a "stub end" and arrangement is made for steam purging this end when shutting down week ends. Air for burners is supplied by blower at 1-pound pressure. This blower is mounted back of furnace on a platform supported by furnace-binding steel.

Utilize Gearmotor Hoists

Doors are operated by gearmotor hoists, are fully counterweighted and are stopped in either the open or closed position by limit switches. However, they may be stopped in any intermediate position.

Furnaces utilize a number of different grades of brick such as special shapes of high grade refractories, first quality firebrick and chrome, etc., each being selected to

Forging manipulator is used to charge ingots into furnaces

give maximum service and lowest cost per ton. Entire furnace carries at least 2½ inches of insulation. Hearth is dolomite and was burned in before charging ingots.

Ingots are placed upon two 6 x 6-inch steel billets so they are above bottom of furnace. These billets have to be renewed about once a month. Slag spouts have been provided in the backwall, but to date have not been needed even though the furnace has been operated above 2500 degrees Fahr. much of the time. Most of the hot top brick is removed from the ingots before charging.

Use Forging Manipulator

Ingots are charged into and removed from the furnace by means of a forging manipulator after being loaded onto cars—20 per car—in the stripper building. This car then is pulled to a point where the ingots may be reached by the manipulator. Five ingots are charged into each door. Later they are removed from the furnace and carried by the manipulator to a chain-type ingot transfer which discharges them onto the mill table. Manipulator and chain transfer are fast enough for all future requirements.

Results obtained show that scale loss may be varied between ¾ and 1½ per cent to suit the type of steel being heated. Any type of atmosphere may be selected and held in the furnace over the entire firing range. Opening and closing furnace doors does not affect the heat since the automatic pressure control is fast enough to prevent infiltration of air.

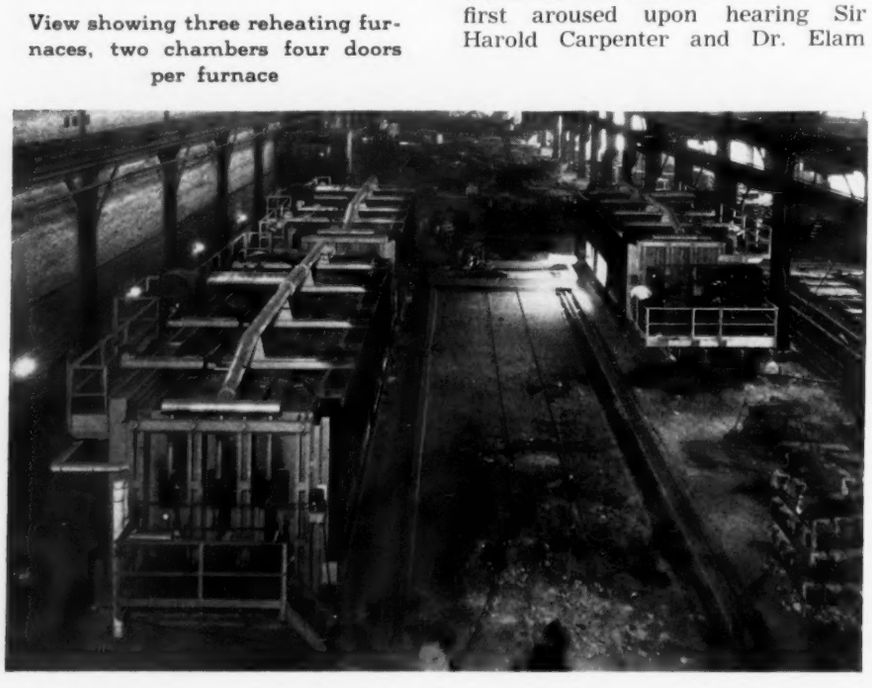
The damper-control pressure tap is in the center of furnace roof and furnace pressure is held to about 0.08-inch water pressure. Scale which forms clings to the ingot as it is removed from furnace, but readily breaks loose at the mill, leaving a clean surface. All steel is uniformly heated and well soaked. Chipping costs have been reduced. Steel heated in these furnaces is not washed and presents the appearance of steel drawn from one of the new type automatically controlled soaking pits.

This group of three furnaces with its associated equipment was designed and built by Salem Engineering Co., Salem, O., and replaces a continuous furnace. This new equipment is flexible and is heating at about two-thirds former fuel cost.

A record is provided of each heat so the metallurgical department may specify a given treatment and be certain that instructions have been carried out. Also, it is possible repeatedly to obtain any desired results.

One stack serves the group of three double furnaces. All stack flues are insulated, partly to protect the concrete flue tunnels but principally so a waste-heat boiler or some type of heat salvaging unit may be installed later. Since ground water is troublesome at certain times of the year, provision was made for draining all flues to one central point where seepage is removed by an automatic sump pump.

View showing three reheating furnaces, two chambers four doors per furnace



British Institute Hears Plastic Strain Lecture

■ PLASTIC strain in metals was approached from the point of view of a mathematician by Prof. G. I. Taylor in the twenty-eighth annual May lecture of the British Institute of Metals in London, May 4. The lecturer's interest in metals was first aroused upon hearing Sir Harold Carpenter and Dr. Elam describe their discovery of the methods by which large crystals of aluminum could be prepared. This led to collaboration with Dr. Elam in analyzing the strain in large crystals when subjected to end load. Later, a method for straining single crystals by compression was developed which produced uniform strains.

The method used for analysis was to calculate from external strain measurements the "unstretched cone"—that is, the cone containing all directions in the crystal which are unchanged in length by the strain.

The method was illustrated by means of a model in which the planes and directions of a cubic crystal constructed into the form of a hemispherical wire cage. This cage was mounted on gymbals and projected by an arc light onto a screen so that the properties of stereographic and other projections could be demonstrated.

At the end of the lecture, the bearing of experimental results obtained with single crystals on crystal aggregates was discussed. The fallacy of assuming that each grain in an aggregate can be treated as though its neighbors do not exist was pointed out. It was shown that in a cubic crystal, 5 out of the possible 12 modes of slipping must operate simultaneously, in order that a crystal in an aggregate may be deformed so that its boundaries still fit in with those of its neighbors. Finally, the complete solution for the case of an aggregate extended by direct load was described and the resulting predictions compared with experiment.

Impact Testing Topic at A.S.T.M. Annual Meeting

(*Concluded from Page* 42)

Report of committee D-3 on gaseous fuels.

Friday, July 1

MORNING

Nonferrous Metals

Report of committee E-2 on spectrographic analysis.

"An Arc Source for Quantitative Spectral Analysis," by C. J. Neuhaus, International Nickel Co. Inc., Huntington works.

Report of committee E-3 on chemical analysis of metals.

Report of committee B-2 on nonferrous metals and alloys.

"Compressive, Impact, and Other Mechanical Properties of Nickel and Some of Its High-Strength, Corrosion-Resisting Alloys," by Charles F. Catlin and W. A. Mudge, International Nickel Co. Inc., Huntington works.

Report of committee B-3 on corrosion of nonferrous metals and alloys.

Report of committee B-6 on die-cast metals and alloys.

Report of committee B-7 on light metals and alloys, cast and wrought.

Report of joint committee on exposure tests of plating on nonferrous metals.

Refrigerator Cases

Fixtures, welding procedure, location of welding machines and conveyors—all are correlated with stamping and forming work for continuous production at high speeds

■ MANUFACTURE of domestic refrigerator cabinets occupies a large proportion of the 1,000,000 square feet of floor space devoted to steel fabrication and finishing at the 28-acre plant of Norge division of Borg-Warner Corp., Muskegon Heights, Mich. Daily output includes 1000 washing machines and 1000 ranges in addition to 2000 refrigerators.

Steel plant alone covers more than 70,000 square feet. Sheet steel is delivered from railroad cars to presses by gasoline-electric trucks. Steel is purchased either sheared to proper size of blanking or in multiples of the size required. After squaring, sheets are routed to presses for stamping. Ranging from 15 to 450 tons capacity, presses are equipped with pneumatic pressure pads regulated to suit the particular draw. Practically all refrigerator parts are stamped from sheet steel.

Fabrication of refrigerator end panels requires 31 operations before application of finish. Similarly, tops require 15 operations; doors, 12 operations; tanks, 7; evaporator shields, 13; evaporator sleeves, 7. However, these operations are so correlated and run in sequence that only a short time elapses from raw sheet to finished part. Procedure employed in fabricating the interior tanks for refrigerators is a good example.

Tanks Are Seam Welded

These units consist of rectangular tanks open on one side. They are made from three pieces of sheet, one forming the sides and back, the other two pieces being used at ends. Fabrication begins with blanking out and piercing the main sheet. Then a narrow strip at two sides of sheet is turned up at right angles to form a lip to which the ends are subsequently welded. Next, the sheet is rolled along the other two edges to form the special shaped strip used to hold the tank in place in the refrigerator. Following this, the flat sheet is formed in a U, producing the back and sides of the tank. Now it is ready to assemble with the ends, which have also been blanked, pierced and roll-edge formed.

Ends are fastened to sides by seam welding to right-angle strips formed on the side sections. Parts come on roller conveyors to a battery of three seam welders. Fig. 1 shows a close-up of one of these with two others in the background at right. This particular unit welds the seam where the end piece joins the back of the tank.

Fixture holding tanks is rolled out from welder on rails set in the floor, in which position the end clamps are unlatched and swung open to permit placing two tanks, one at each end of fixture. Clamps are closed, toggle latches locking the work tightly in the fixture. Entire fixture then is rolled under welding heads and latched in place.

Seam welder proper is mounted on rollers riding on rails above the fixture. Transformer, flexible con-

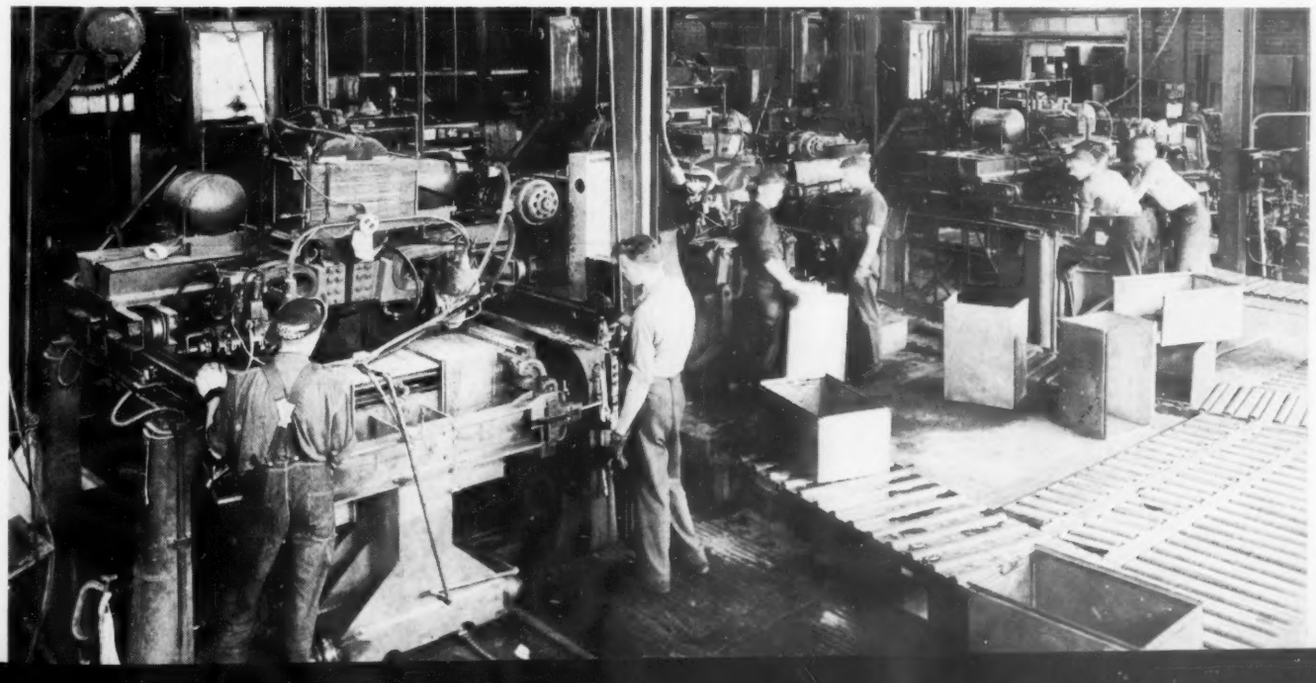


Fig. 1—Battery of seam welders is employed to handle refrigerator interior cabinets. Seams in two cabinets are welded simultaneously in near machine

nections to wheels, and wheel electrodes can be clearly seen in Fig. 1. With fixture in place, welder is started moving along the rails, wheel electrodes riding over the seams to be welded. As two seams are made simultaneously, welding current flows from one wheel to the work, through the fixture to the other tank and back to the other wheel, completing the circuit.

Limit Switches Used

A tight, almost continuous weld is made by an automatic timer which interrupts the welding current to form pulsations producing a series of closely spaced spot welds in the work. Time interval between pulses of current may be adjusted to produce a continuous welded seam. Limit switches actuated by the carriage shut off the driving motor and welding current as the seam is completed, fixture is rolled out and tanks replaced ready for the next weld.

Seams where ends join tank sides are made in another machine which is set up to make both seam welds at one tank end simultaneously. Operation of this unit is similar to that just described. Entire layout is complete with system of roller conveyors to handle the work from station to station and is closely correlated with stamping and forming operations so complete fabrication of these tanks, including blanking, right angle form, roll form, U form, and seam welding only consumes 5 minutes. Note various working levels, floor heights, conveyors, etc. in Fig. 1, all of which enter into these highly coordinated fabricating operations.

Similarly, operations to form an oven liner for a range include a square shear operation, pierce mounting holes, blanking flue holes, pierce vents and form right angle flange, fold and seam weld. All these operations require only 4 minutes in a progressive lineup of equipment.

Assembly of steel cabinets for the standard line of refrigerators involves use of projection welding. These cabinets consist of a deep drawn top piece which contains the smooth rounded corners desired for modern appearance; two side sections, formed to produce the four vertical corners; a flat sheet to close the back; and a formed piece which fits up in the bottom separating the upper part of the cabinet from the motor and compressor space. At time of forming end panels, a row of small bumps or projections is stamped along the upper edge of the panel.

Projections Aid Welding

A side panel is fitted inside the top piece with welding projections on side contacting top section. When pieces have been clamped together with top overlapping side, current is applied to fuse the metal together. Current, concentrated at projections, fuses them first to form a strong substantial joint with comparatively small welding current. Other side panel is inserted and welded in a similar manner in this same projection welding machine which is shown at left in Fig. 3. Chain conveyor, part of 20 miles of conveyors in this plant, can be seen at extreme left of this illustration.

Next the partially assembled cabinet is inserted in the fixture shown in foreground of Fig. 3 and the back panel spot welded in place. The two joints between back panel and side pieces are made by a spot welding head which moves along the seam producing spot welds, uniformly spaced. Welds where back panel joins top piece are made by another operator. A hand electrode may be placed against a bar parallel with the joint and spot welds made by contacting work at desired point, and tripping trigger to actuate the timer controlling welding current.

Bottom subsequently is spot welded to the sides, completing the assembly, which now is ready to be transferred to metal finishing and enameling department.

Fig. 2 is a closeup of one of the many other welding operations connected with the manufacture of refrigerators, washing machines and ranges in this plant. Here the operator is handling a spot welding operation on stamped steel refrigerator legs.

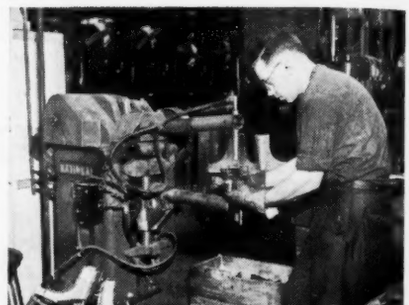


Fig. 2—Spot welding operation on stamped steel refrigerator legs

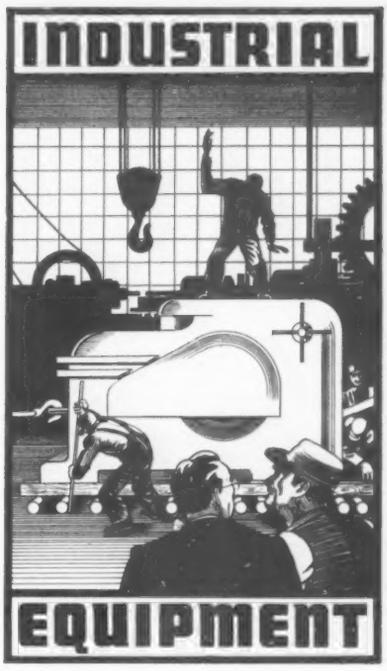
Fig. 3—In foreground, back panel of refrigerator cabinet is being spot welded to other sections of cabinet. At left, cabinet tops are being secured in place by projection welding

Eye Test Checks Fraudulent Claims

■ American Optical Co., Southbridge, Mass., reports a new eye test claimed to trap persons fraudulently claiming damages for impaired eyesight.

Before the test subject's eyes are two polarized lenses with the polarization planes at right angles to each other. By turning the polarized lens in front of the projector from one point to another, test letters become visible to the right or left eye of the subject at the will of the examiner, but totally unknown to the subject himself.

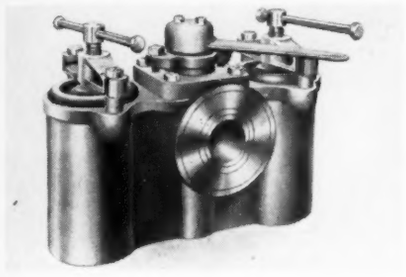
In this way fraud is quickly detected. Even the visual acuity of the malingering eye can be determined without the subject's realizing it.



Oil Baskets Have Large Straining Area

■ Sheffler-Gross Co., Fifth and Chestnut streets, Philadelphia, has placed on the market Duoflo suction oil strainers which can be applied to industrial oil burning furnaces, oil processing lines or any place where oil is used as a fuel or in a process.

Strainer is made of semisteel, and has two perforated baskets held in place by covers. This duplex con-



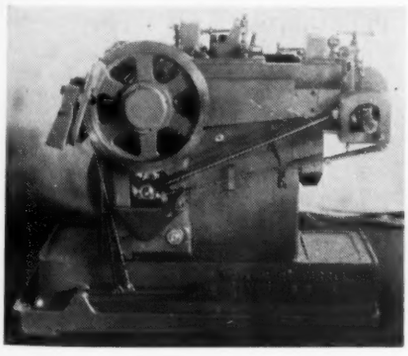
struction allows one strainer to be cleaned while the other is in operation. Baskets are large and have a straining area much greater than that of the oil intake pipe. By turning the plug cock and deflecting the oil through one strainer, the other can easily be removed for cleaning.

Units are made in five different sizes. They are available from 1½ to 4 inches to suit the requirements of the particular system. Strainers are flanged and drilled to standard specifications. Each assembly is hydrostatically tested to 150 pounds per square inch.

Blanks Produced At High Speed

■ Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn., has introduced an automatic Hypro header of the solid die, double stroke crank type which produces screw blanks and similar headed work at high speed.

The machine is built for either belt drive or arranged for individual motor drive by multiple V-belts. Two standard sizes are offered by the company; the 3/16-inch machine for work up to 1 inch long under the



head, rated at 225 pieces or 450 blows per minute, and the ¼-inch size for 1½-inch work which operates at 175 blanks or 350 blows per minute.

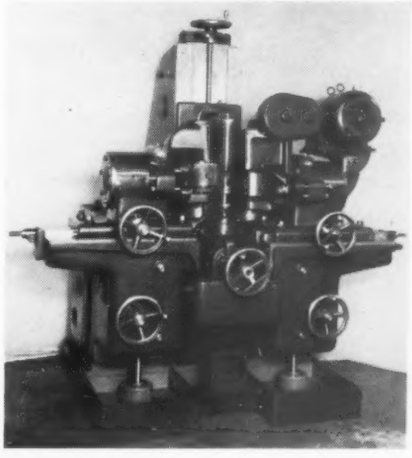
Roll feed with an auxiliary mechanism makes it impossible to manually engage ratchet and pawl, except at the start of the forward feed movement. This also makes it impossible to feed a shorter length wire than required.

The device which cuts off the wire and tranfers the blank into heading position is adjustable for timing and for locating the knife relative to the dies. Heading unit, which includes the horizontally reciprocating gate and the vertically reciprocating punch slide, is designed for high speed production as also is the knock-out device which takes the heading thrust and ejects the headed work.

The 3/16-inch belt-driven machine occupies a floor space of 32 x 56 inches and weighs 3300 pounds. The ¼-inch unit takes up 50 x 66 inches of space and weighs 6600 pounds.

Finishes Two Gears In One Operation

■ Michigan Tool Co., Detroit, has introduced a new model duplex gear finisher designed for use where re-



quirements call for finishing both large as well as small gears on a single machine or where it is desired to finish two gears simultaneously.

Work is mounted with axis vertical, between centers, and fed away from the operator, passing between two crossed axis cutters. The latter are preset to correct center distance for finishing the gears to exact size. At the end of the stroke the feed is reversed, returning the work through the cutters to the starting position. Entire cycle is automatic, and controlled with a push-button.

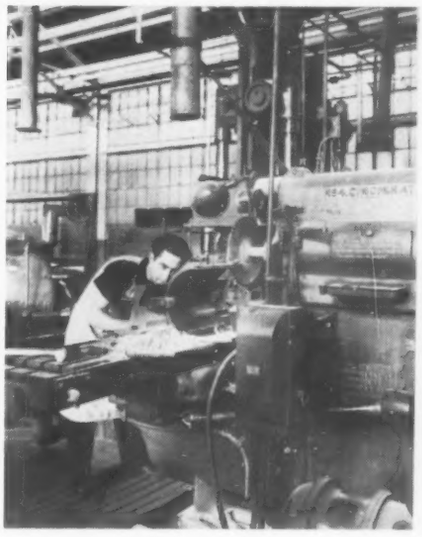
Hand wheels provide independent adjustment as to height, independent lateral settings to control size, while individual worm and wheel adjustments are provided for setting amount of crossed axis desired with each cutter. A sine-bar setting for adjusting to correct load is provided for each cutter head.

Cutting oil pump and tank of the finisher are made in several sections and built into base of the machine. Guards with hinged doors are provided on the machine in front of the work to prevent splashing of coolant.

Circular Saw Has Replaceable Teeth

■ Huther Bros. Saw Mfg. Co., Rochester, N. Y., has introduced a circular saw, the teeth of which are tungsten carbide tipped for cutting nonferrous metals, fibers and plastics.

Saw is segmented, five teeth to a segment and each tooth being tipped with a Firthite sintered carbide tip. Segments are replaceable and damage does not mean the re-



placement of the complete saw.

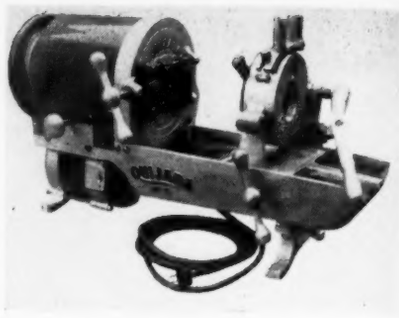
Illustrated is an application of a saw 11 inches in diameter with a 7/16-inch face cutting Micarta laminated plastic steel mill bearings to the proper segment arc. The bearing shown is about 12 inches inside diameter with a ¾-inch wall. It is 12 inches long and has a 135 degree segment arc.

Pipe Threader Powered By Gasoline Motor

■ Quijada Tool Co., 620 North San Gabriel boulevard, San Gabriel, Calif., has placed on the market a No. 2 pipe threading and cutting machine which with its automatic opening and closing chuck features combined with its two gear speeds enables it to cut threads at high speed.

Total weight of the unit is 140 pounds. It is equipped with a detachable die head sizes of which may be changed to longer dies to thread ½ or ¾-inch pipe.

The unit is powered by a 1½ horsepower gasoline motor which will run 6 hours to one gallon of gasoline. Engine is air-cooled and has linite pistons and connecting rods. Entire machine is fitted with ball bearings throughout. The motor is powerful enough to cut 2-inch pipe in high

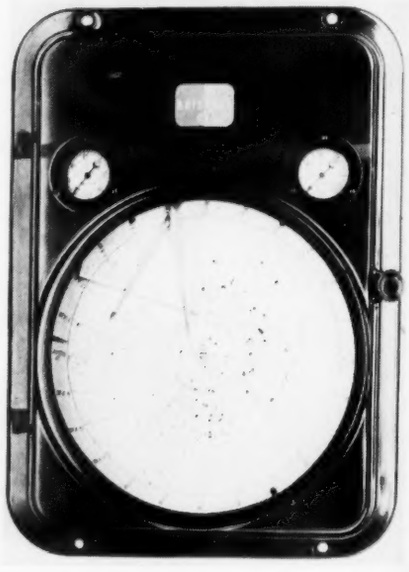


gear. If desired a 1 horsepower electric motor can be supplied for the threader.

Control Instrument Has Wide Throttling Range

■ Bristol Co., Waterbury, Conn., has introduced an instrument with wide throttling range and automatic reset that provides for point-control, and is adaptable to various types of continuous processes which involve the control of temperature, pressure, vacuum, flow and liquid level.

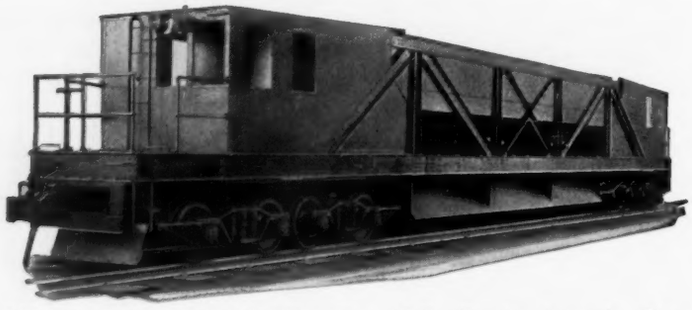
The instrument operates on the



basic principle of pneumatic control. The system consists of a thin vane floating between two opposing small jets of air which throttles the discharge from the jets by passing between them without actually coming in contact with the nozzle surface. Any load change, accompanied by a movement of the pen away from the control point, produces a change in the controlled air pressure sufficient to give the diaphragm control valve the required opening to bring the variable back to the control point.

Design of mechanism makes it possible to obtain this change automatically at a rate that corresponds to that required to the particular process being controlled.

ATLAS ORE TRANSFERS



100 ton—3 compartment Ore Transfer. Roller Bearing Journals. Double end control for car operation. Individually operated discharge gates.

OTHER ATLAS PRODUCTS

Gas-Electric and Diesel-Electric Locomotives . . . Electric Transfer Cars for Blast Furnaces and Steel Plants . . . Stockhouse Scale Cars for Blast Furnaces . . . Concentrate and Calcine Cars for Copper Refineries . . . Automatic and Remote Controlled Electric Cars . . . Pushers, Levellers and Door Extractors . . . Coal Charging Lorries, Coke Guides and Clay Carriers . . . Atlas Patented Coke Quenching Cars for By-Product Coke Ovens . . . Atlas Patented Indicating and Recording Scales . . . Special Cars and Electrically Operated Cars for every conceivable Purpose.

THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Carburizing Ring Gears

(*Concluded from Page 49*)

but we find it best to maintain percentages of carbon monoxide and carbon dioxide close to 2 per cent and 10 per cent, respectively, for the diluent or DX gas. With the correct proportions of DX and natural gas the effluent or spent gas will analyze close to the following composition:

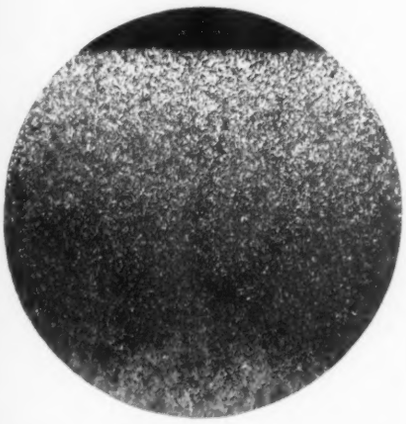


Fig. 2—Structure of case produced as revealed by 2 per cent Nital etch

Constituent	Per Cent
Carbon dioxide	0.6
Oxygen	0.0
Carbon monoxide	10.4
Hydrogen	25.6
Methane	26.7
Nitrogen	Balance

During the experimental period and also later on when the furnace was on a production basis different flows of gas were tried. We found cleanest work and best performance of the furnace was obtained by using 98 cubic feet of diluent or DX gas and 80 cubic feet of raw natural gas per hour. Gas flows greater or less than these figures were attended with difficulties in the form of decarburization, coke deposits and distortion.

Fig. 3—Case structure magnified 1000 diameters, also 2 per cent Nital etch

Only one operator is required to load and discharge the furnace. A tray load of gears is pushed in every 45 minutes. These are mostly 2-speed automotive ring gears of SAE 4620 steel, each weighing 27 pounds. The gears are stacked 3-high, there being two trays per push. Fig. 1 illustrates a load of gears about to be admitted into the charging vestibule. A carburizing temperature of 1700 degrees Fahr. produces a case depth of 0.050 to 0.065-inch in 12¾ hours with this work.

After charging the furnace the operator manually pulls one tray from the muffle into the discharge vestibule and removes all three gears in rapid succession. Gears are placed in individual cooling receptacles where they are allowed to remain one minute at which time the cover of the receptacle is automatically released thus signaling the op-

Announcing

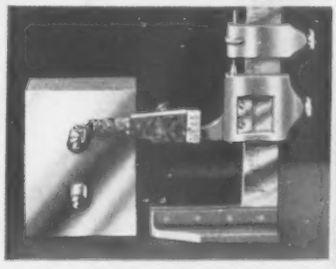
A NEW POPULAR PRICED STARRETT INDICATOR

"Universal Junior" No. 564

GRADUATED SCALE, with a range of .012 by thousandths, can be set in preferred position by mounting indicator on side or top of shank.

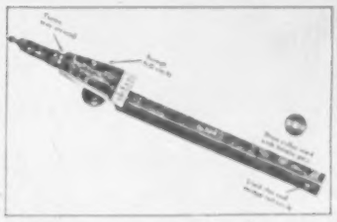
Here is an indicator that is sensitive, accurate, flexible and adaptable to practically every conceivable indicating operation. It is made to Starrett standards of precision and workmanship *and sells for only five dollars.*

Ask your regular distributor to demonstrate this new Starrett Indicator or write for "Universal Junior" Folder F.



ADAPTABILITY illustrated by indicator removed from shank and clamped to jaw of height gage.

COMPLETE FLEXIBILITY is shown by indicator mounted in lathe tool post. Point which is frictionally held in rotating sleeve can contact work at any angle.



ACCURACY is assured by simple design and careful workmanship. Indicator is 2½ inches long, shank ⅝ inches. Case-hardened steel and die-cast parts.

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World's Greatest Toolmakers — Manufacturers of Hacksaws Unexcelled — Steel Tapes Standard for Accuracy — Dial Indicators for Every Requirement

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erator that the gear is ready for quenching. This delayed quench has been found necessary to control distortion as well as to impart certain metallurgical characteristics to the gear surface.

Besides the routine mechanical inspection each gear tooth is tested with a sharp file. Any gear which does not resist the filing operation is rejected. Actual hardness ranges from 59 to 61 Rockwell C. Inspection for case depth is made by periodically examining sample gears. In addition, a test pin is placed in every fourth tray and subsequently fractured to show case developed.

Microstructure and case composition are studied separately. The accompanying photomicrographs are typical case structures being produced regularly with SAE 4620 steel carburized in this furnace. One-inch round bars are sent through the furnace with the work at regular intervals and later analyzed to assure that proper carbon content is being maintained. A typical analysis of the case of these bars is shown:

Below surface depth, inch	Carbon content, per cent
0.005	1.07
0.010	1.04
0.015	0.98
0.020	0.89
0.025	0.80
0.030	0.71
0.035	0.62
0.040	0.50
0.045	0.44
0.050	0.37

The muffle, an alloy of 35 per cent nickel and 15 per cent chromium, has been in use approximately one year and as far as can be determined shows no evidence of failure although trays and separators made from the same alloy have presented some difficulties. Our experience indicates that design and casting practice are more important than the type of alloy used. Quality of the work is on a par with that produced by the pack method of carburizing.

The gas carburizing operation described appears to have several advantages probably the most important of which are its speed and the improvement in shop conditions. A load is carburized in 12¾ hours by this method against 18 hours required by the pack method. Gas carburizing also eliminates separation of the work from the carburizing material prior to direct quenching, a necessary step in pack carburizing. In addition, one operator can handle the entire work.

Case Hardening Baths Are Interchangeable

■ A. F. Holden Co., New Haven, Conn., announces a complete new line of case hardening baths. These are as follows: Light case 100 providing penetration of .001 to .007, light case 200 with penetration of .001 to .010, light case 300 with penetration of .001 to .015, hard case 400 with penetration of .001 to .040 and hard case 500 with penetration of .001 to .060.

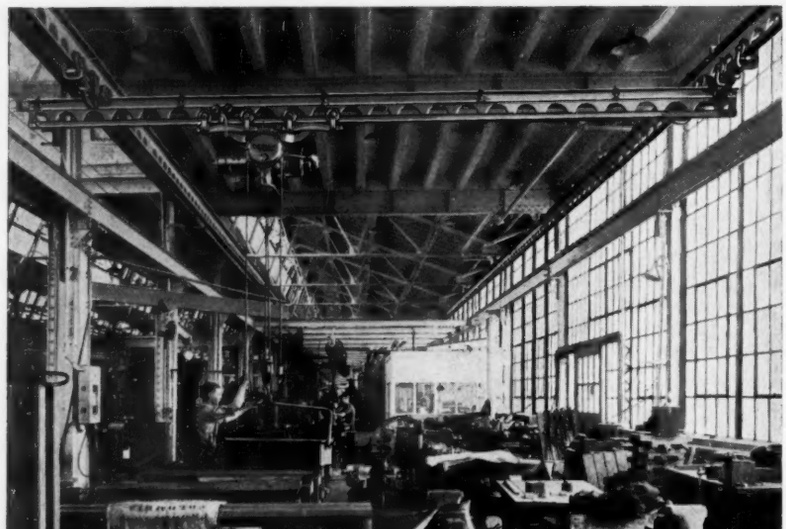
These baths are so designed as to be interchangeable in chemistry inasmuch as the hard case group may be added to the light case group and vice versa. As an illustration, light case 200 may be used for .010 penetrations. Where deeper penetrations are required for certain production jobs to .020 or .040, these may be attained by adding hard case 500 to light case 200.

According to the Holden company, no insolubles are present in these bath materials so that no washing problems are encountered where an oil quench is used. In addition, roughly 50 per cent less time is required to produce a given case depth as compared with other methods, it is said.

CLEVELAND TRAMRAIL

MATERIALS HANDLING EQUIPMENT

In the Metal Working Industry



• In the Machine Shop, Hand operated light weight, fast, easily propelled smooth running cranes and carriers, are effective equipment for service.

• This is a two ton job with motor operated hoist.

ALSO BUILDERS OF

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THE CLEVELAND CRANE & ENGINEERING CO.

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Or consult your phone directory under Cleveland Tramrail.

Interplant Shipping

(*Concluded from Page* 44)

Even pig lead is being handled the unit-load way. Formerly, a tremendous amount of labor was involved in loading, unloading, and transferring lead. With the adoption of the new method, several units are strapped together, as in Fig. 18 and trucked to their place of use. This has reduced time required to unload a car of lead in this form to only one-fourth that formerly necessary. Cost has been cut to about 1/3 the former amount.

Fig. 18—Pig lead is now handled at one-third the former cost

British Steelmaking Is Reviewed in Symposium

(*Concluded from Page* 52)

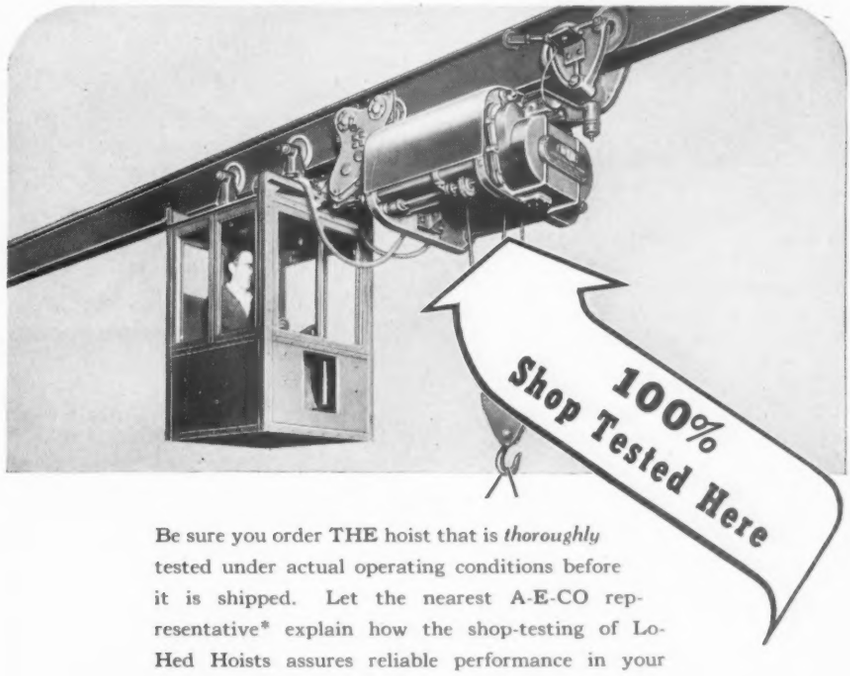
Cance's paper and said that he agreed with the author that to obtain clean steel, additions should be added in the bath and not in the ladle. Dr. Hatfield pointed out that physical chemistry cannot yet be applied in an exact way to everyday practice, since the materials thrown into the furnace are not exactly those represented in a chemical formula by CaO, FeO, etc. Another speaker also pointed out that certain phenomena happen in actual practice, phenomena concerning which the laws of physical chemistry do not seem to apply.

Remaining sessions of the meeting were devoted to papers on general subjects. At one of these, special report No. 20, "Application of Time Study to Rolling Mills," was presented on behalf of the rolling mill committee of the Iron and Steel Industrial Research council.

Dr. C. A. Edwards, principal, University College of Swansea, D. Luther Phillips and D. F. G. Thomas, Swansea, contributed a paper on "Influence of Composition and Treatment on the Rate of Acid Attack on Mild Steel." The investigation carried out dealt with the influence of phosphorus, carbon, sulphur and copper on the rate of attack by 6 per cent sulphuric and 2 per cent citric acids on mild steels, both in the annealed and in the heavily cold-rolled conditions. The steels were made in quantities of about 24 pounds in a high-frequency induction furnace under carefully-controlled conditions, and chill-cast in the form of thick plates suitable for rolling into packs of thin sheets, as in ordinary tin plate manufacturing practice.

Passenger Cars Have Four Wheel Traction

■ Stimulated interest and active buying of all-wheel-drive vehicles by oil scouts and operators, mining engineers, mail carriers and logging contractors have led Marmon-Herrington Co., Indianapolis, to offer a complete line of passenger and commercial cars embodying this type of drive. The company also converts standard Ford passenger cars, commercial and light delivery models into all-wheel-drive units, giving them additional power to compete with rough and muddy roads.



Be sure you order THE hoist that is *thoroughly* tested under actual operating conditions before it is shipped. Let the nearest A-E-CO representative* explain how the shop-testing of Lo-Hed Hoists assures reliable performance in your plant. Ask him to explain Lo-Hed's exclusive features that give you fast, dependable operation with minimum maintenance cost. Let him show you Lo-Hed's uses in scores of industries. Find out *why* Lo-Hed is the logical hoist for EVERY purpose and why it is the *only* hoist for low head-room conditions. A-E-CO Lo-Hed Hoists are built in 98 standard models—from ¼ to 12 ton capacities.

*Classified phone directories list the local A-E-CO representative in principal cities. Call him in . . . or write us for the new hoist catalog.

Other A-E-CO Products: Taylor Stoker Units — Marine Deck Auxiliaries — Hele-Shaw Fluid Power

A-E-CO Lo-Hed HOISTS

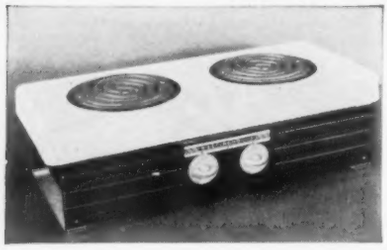
AMERICAN ENGINEERING COMPANY

2484 ARAMINGO AVENUE, PHILADELPHIA, PA.

NEW METAL PRODUCTS

■ Hot plates of streamlined design featuring Corox economizer units and finished in black, white and chrome have recently been introduced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Small and portable, these units are suitable for apartments, summer

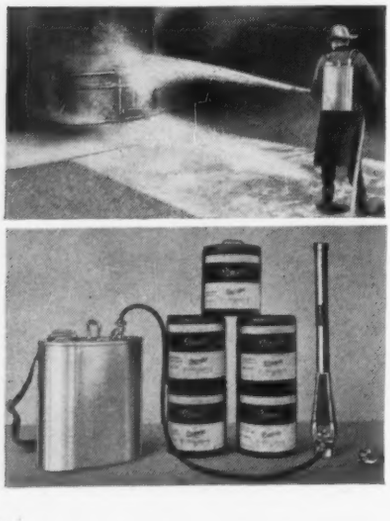


cottages or as auxiliary devices in the home for any kind of surface cooking or heating. The Corox economizer units are 6 inches in diameter and are provided with four heats; 1150 watts on high, 575 watts on medium, 287 watts on low and 120 watts on simmer. Closed type construction affords no cracks in which to collect spilled food or dirt, and rotary type switches are utilized.

The plates come in two models, the deluxe and standard. Both are identical in design, differing only in that the deluxe has two economizer units while the standard one.

■ A larger capacity foam-making water nozzle model PP24 that makes 500 to 750 gallons of fire-smothering foam per minute and produces 350 gallons of foam from only one gallon of Phomaide solution has been placed on the market by Pyrene Mfg. Co., Newark, N. J.

When the nozzle or play pipe is



connected to a hose line and water turned on, Phomaide and air are drawn into the water stream to form foam. Only one person is required to operate the nozzle, operation of which may be continued indefinitely by pouring additional solution into a knapsack carried on the operator's back.

In addition to the foam stream for fighting flammable liquid fires, a water stream for extinguishing any lingering fire in ordinary combustibles may be utilized by closing the cock and cutting off the foam-making solution.

■ Designed for effortless work-flow, the new all-white enamel cabinet model ironer with porcelain enamel top recently introduced by Blackstone Mfg. Co., Jamestown, N. Y., is an outstanding example of styling along simple lines for effec-

tive appearance and to conserve space.

An outstanding feature of the ironer is the cabinet hung on a compound pivotal hinge. When opened this swings into convenient position for use as a shelf for finished ironing.

■ Posture chairs designed to make correct posture easy and natural, and to induce its occupant to sit erect without effort have been introduced by Harter Corp., Sturgis, Mich. This feature combined with the effortless method of adjusting the chair makes the unit a self-fitting affair.

The horizontal or lateral movement of the back is governed by a control as is the adjustment for seat height and back height. The seat is of spring construction and

covered by leather. Castor-equipped legs facilitates moving the chair about.

■ A small portable blueprinting machine intended for personal use and branch offices where jobs for commercial blueprinting is not available has been introduced by Vandenwood Co., 3030 Euclid avenue, Cleveland.

The printer, known under the name Baby Blue, is provided with a portable case which is complete with washing and fixing trays, fixing salts and a supply of ready cut sensitized 8½ x 11-inch paper. Upon plugging it in any ordinary lighting circuit it is ready for service. Maximum capacity of the machine is prints 9 x 18 inches.

■ Kent Co., 103 Canal street, Rome, N. Y., has placed on the market an electric floor machine which does any type of floor work including scrubbing refininshing, polishing and buffing.

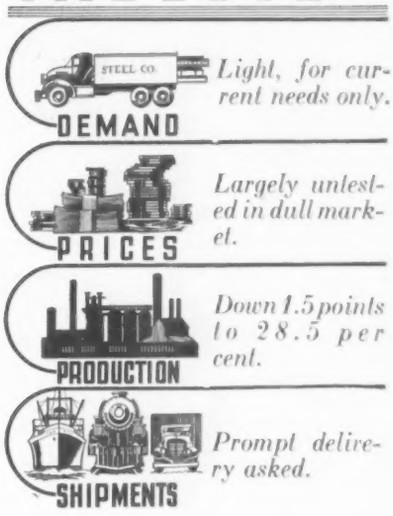
This unit is referred as the 11-inch size, and is the smallest of all the various models but has incorporated in it all the features of the larger units, including offset motor. Some of its other features include positive lubrication, straight-line drive, automatic handle switch and gears housed in grease.

■ Stainless steel color stripe molding to be used to give that streamlined effect has recently been developed by Pyramid Metals Co., 455 North ,Oakley boulevard Chicago, The stripe embodies a snap-on feature which is applied by first laying a track and then snapping on the molding. Stripes may be obtained in brass, bronze, copper or stainless steel finishes with other colors made to order.

Steel Market Drifts as Consumers Delay Buying

Price Certainty Brings No Added Demand; Fall Upturn Seen

MARKET IN TABLOID ★



■ WITH summer just ahead the steel market seems to be drifting without definite indication of a trend. Buying and consumption hold fairly steady at less than one-third the industry's capacity, with a slight tendency downward.

In addition to general adverse influences some seasonal factors are entering the picture, agricultural implement manufacturers tapering their production and the time for railroad buying being nearly over for this year.

Some support is being given by an upward tendency in building, but this is slight. Delay in approving steamship and railroad purchases by government agencies having jurisdiction is keeping considerable tonnage of heavy steel from being placed with mills.

With these factors holding back production the opinion is growing that no forward movement may be expected until fall, when automotive buying is expected to be resumed and tonnage now being delayed may be on mill books.

No upturn in buying has appeared following announcement of prices for third quarter, incentive to cover for the future being absent.

Sharp contraction in production by important producers in the Pittsburgh district last week was a strong factor in bringing the national rate down 1.5 points to 28.5 per cent. Memorial day probably will have an effect in the rate this week. Pittsburgh declined 8 points to 22 per cent, Buffalo 4.5 points to 21 per cent and Cincinnati 17 points to 28 per cent. Wheeling gained 3 points to 41 per cent, Cleveland 3 points to 26 per cent, Birmingham 6 points to 69 per cent and Youngstown 1 point to 27 per cent. Rates were unchanged from the previous week at Chicago, 29 per cent, Eastern Pennsylvania 27, New England 30, St. Louis 33.3 and Detroit 18 per cent.

Following the lead of steelmakers in reaffirming prices for third quarter pig iron producers have made similar announcements, covering all grades at all producing points. This has had no appreciable effect on the rate of buying and releases against contracts are in light volume.

Based on several sales domestic iron ore producers have continued prices at the level established March 12, 1937, the first time prices had been advanced in eight years. Production and shipments are light as stocks at lower lake docks and furnaces are sufficient for needs unless a decided upturn in steel production takes place.

No action has been taken on prices of galvanized sheets but it is expected an announcement will be forthcoming during the present week, to clear the last item in the flat-rolled products division. Bolt and nut prices have been reaffirmed.

Automobile production continued to taper slightly last week, total output being 45,120, compared with 46,810 the week before. General Motors assembled 20,300, against 18,550 in the preceding week; Chrysler produced 7000, a decline from 8550; Ford's output fell to 12,760 from 14,885. Independents gained slightly, to 5060 from 4825.

Exports of steel and iron in April were 489,202 gross tons, compared with 526,882 tons in March and with 683,674 tons in April, 1937. For four months this year they were 2,063,019 tons, including 1,261,927 tons of scrap, compared with 1,746,830 tons in the same period last year, which included 1,014,255 tons of scrap. Imports totaled 21,237 tons in April, compared with 11,827 tons in March. For four months this year imports were 82,284 tons, in the same period of 1937 they were 203,793 tons.

Composite price of steelmaking scrap holds up well in face of almost complete absence of buying. A decline of 25 cents at Chicago last week brought the composite down 4 cents to $11.33. The iron and steel composite declined 6 cents to $38.44 on the basis of second quarter base prices, though it drops to $37.61 by inclusion of the newly announced bases applicable for the remainder of second quarter and for third quarter. The finished steel composite is unchanged at $61.70 on the basis of second quarter bases, and down to $59.80 with new bases applied.

COMPOSITE MARKET AVERAGES

	May 28	May 21	May 14	One Month Ago April, 1938	Three Months Ago Feb., 1938	One Year Ago May, 1937	Five Years Ago May, 1933
Iron and Steel	$38.44	$38.50	$38.52	$38.61	$38.90	$40.06	$28.33
Finished Steel	61.70	61.70	61.70	61.70	61.70	61.70	45.10
Steelworks Scrap ..	11.33	11.37	11.59	12.30	13.54	18.49	9.23

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	May 28, 1938	April 1938	Feb. 1938	May 1937
Steel bars, Pittsburgh	2.45c	2.45c	2.45c	2.45c
Steel bars, Chicago	2.50	2.50	2.50	2.50
Steel bars, Philadelphia	2.77	2.765	2.75	2.74
Iron bars, Terre Haute, Ind.	2.35	2.35	2.35	2.35
Shapes, Pittsburgh	2.25	2.25	2.25	2.25
Shapes, Philadelphia	2.465	2.465	2.465	2.455
Shapes, Chicago	2.30	2.30	2.30	2.30
Tank plates, Pittsburgh	2.25	2.25	2.25	2.25
Tank plates, Philadelphia	2.445	2.445	2.445	2.435
Tank plates, Chicago	2.30	2.30	2.30	2.30
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	3.15	3.15
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.80	3.80
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.50	2.50
Sheets, No. 24, hot anneal., Gary	3.25	3.25	3.25	3.25
Sheets, No. 24, galvan., Gary	3.90	3.90	3.90	3.90
Plain wire, Pittsburgh	2.90	2.90	2.90	2.90
Tin plate, per base box, Pitts.	$5.35	5.35	5.35	5.35
Wire nails, Pittsburgh	2.75	2.75	2.75	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$37.00	$37.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	37.00	37.00
Billets, open-hearth, Pittsburgh	37.00	37.00	37.00	37.00
Wire rods, No. 5 to 9/32-inch, Pitts.	47.00	47.00	47.00	47.00

Pig Iron

	May 28, 1938	April 1938	Feb. 1938	May 1937
Bessemer, del. Pittsburgh	$25.34	$25.30	$25.26	$25.26
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern del. East. Pa.	25.34	25.34	25.34	25.26
No. 2 fdry., Pittsburgh	25.21	25.21	25.21	25.21
No. 2 fdry., Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	23.89	23.89	23.89	23.69
No. 2X eastern, del. Philadelphia	26.215	26.215	26.215	26.135
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.24	30.04
Gray forge, del. Pittsburgh	24.17	24.17	24.17	24.17
Ferromanganese, del. Pittsburgh	107.77	107.77	107.49	107.29

Scrap

Heavy melting steel, Pittsburgh	$11.25	$12.70	$14.15	$19.55
Heavy melt. steel, No. 2, E. Pa.	10.25	11.55	13.25	16.85
Heavy melting steel, Chicago	10.75	11.45	12.15	17.55
Rails for rolling, Chicago	14.75	15.25	15.25	21.45
Railroad steel specialties, Chicago	13.25	13.75	14.85	21.35

Coke

Connellsville, furnace, ovens	$4.25	$4.25	$4.25	$4.85
Connellsville, foundry, ovens	5.25	5.25	5.25	5.30
Chicago, by-product foundry, del.	11.00	11.00	11.00	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Base prices, subject to new extras and deductions, effective to Sept. 30, 1938.

Hot sheet, strip, Pitts.	2.30c
Do., Gary	2.40c
Tin mill black, Pitts.	3.30c
Do., Gary	3.40c
Cold-rolled sheets, Pitts.	3.35c
Do., Gary	3.45c
Cold-roll. strip, Pitts.	3.10c
Do., Worcester, Mass.	3.30c

Prices below also apply until June 30, with old extras and deductions, if giving lower net price.

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.76c
Philadelphia, del.	2.72c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pac. base pts. f.o.b. cars, dock,	2.95c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.12c
New York, delivered	4.16c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pac. base pts. f.o.b. cars, dock,	4.40c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.00c
Gary	3.10c
Detroit, delivered	3.20c
Philadelphia, del.	3.32c
New York, del.	3.36c
St. Louis, del.	3.23c
Granite City, Ill.	3.20c
Pac. base pts. f.o.b. cars, dock,	3.60c

Cold Rolled No. 20

Pittsburgh	3.45c
Gary	3.55c
Detroit, delivered	3.65c
Philadelphia, del.	3.77c
New York, del.	3.81c
St. Louis	3.68c
Granite City, Ill.	3.65c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher

Tin plate, coke (base box) Pittsburgh	$5.35
Waste-waste, 2.80c; strip	2.50c
Long ternes, No. 24, unassorted, Pittsburgh	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.55c
Philadelphia, del.	2.44½c
Boston, delivered	2.68c
Buffalo, delivered	2.49½c
Chicago or Gary	2.30c
Cleveland, del.	2.45½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
St. Louis, delivered	2.54c
Pacific basing points, f.o.b. cars, dock,	2.80c
Do. floor plates	4.05c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.46½c
New York, del.	2.52c
Boston, delivered	2.66c
Bethlehem	2.35c
Chicago	2.30c
Cleveland, del.	2.46c
Buffalo, delivered	2.37½c
Gulf Ports	2.66c
Birmingham	2.40c
St. Louis, del.	2.54c
Pacific coast basing pts., f.o.b. cars dock,	2.80c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Philadelphia, del.	2.77c
Boston, delivered	2.89c
New York, del.	2.81c
Pacific coast basing pts., f.o.b. cars, dock,	3.00c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Cleveland	2.35c
Moline, Ill.	2.35c
Buffalo, delivered	2.37½c
Birmingham	2.45c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.67c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.45c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.50c
Gulf ports	2.85c
Pacific coast ports, f.o.b. car docks	2.95c
Philadelphia, del.	2.77c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.30c
Chicago, Buffalo, Cleveland, Birm., Young.	2.35c
Gulf ports	2.70c

Wire Products

Prices apply to mixed carloads, base; less carloads subject to quantity extras.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.15c
Galv. fence wire	3.55c
Woven wire fencing (base C. L. column)	.74
Single loop bale ties, (base C. L. column)	.63

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c
Galvanized wire	2.95c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	3.50c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars, Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	3.00c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	0.15
6100 bars	1.20
6100 spring	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c
Pacific basing pts. f.o.b. cars, dock	3.05c

Strip and Hoops

(Base, hot-rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in.	
Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.60c
Philadelphia, del.	2.72c
New York, del.	2.76c
Cooperage hoop,	
Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.41c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	4.30c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	2.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Car axles forged, Pitts., Chgo., B'ham.	3.35c
Tie plates, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up:

Carriage and Machine

½ x 6 and smaller	65-5 off
Do. larger, to 1-in.	60-10 off
Do. 1⅛ and 1¼-in.	60-5 off
Tire bolts	50 off

Stove Bolts

In packages with nuts attached 70 off; in packages with nuts separate 70-10 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.: ½ to $\frac{7}{16}$-inch	60-10 off
Do., $\frac{9}{16}$ to 1-inch	60-5 off
Do., over 1-inch	60 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	70-5 off

Square Head Set Screws

Upset, 1-in., smaller	80-5 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
$\frac{7}{16}$-inch and smaller, Pitts., Chi., Cleve.	65-5 off

Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Cut Nails

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
½	59½	49
¾	62½	53
1—3	64½	55½

Iron

¾	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50
11 and 12	59½	49

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch lap weld	59½
12-inch, lap weld	58½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¾ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Weld

Sizes	Steel	Charcoal Iron
1½" OD x 13 Ga.	$10.45	$23.71
1¾" OD x 13 Ga.	11.89	22.93
2" OD x 13 Ga.	13.31	19.35
2" OD x 11 Ga.	15.49	23.36
2¼" OD x 13 Ga.	14.82	21.68
2¼" OD x 11 Ga.	17.38	26.02
2½" OD x 12 Ga.	17.82	26.57
2¾" OD x 12 Ga.	18.86	29.00
3" OD x 12 Ga.	19.73	31.36
3½" OD x 11 Ga.	24.89	39.81
4" OD x 10 Ga.	30.81	49.90
5" OD x 9 Ga.	47.57	73.93
6" OD x 7 Ga.	73.25	....

Seamless

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2" OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.89	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.94
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.80-58.80
6 to 24-in., Chicago	54.80-55.80
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

Rerolling Quality

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo, Young., Birm.	$37.00
Philadelphia	42.83
Duluth	39.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleveland, No. 5 to $\frac{9}{32}$-inch incl.	47.00
Do., over $\frac{9}{32}$ to $\frac{11}{41}$-in. incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.00- 4.50
Connellsville, fdry.	5.00- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	10.25
Chicago, del	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.50
Indianapolis, del.	10.5c
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.65

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	6.75c
Per ton, bulk, f.o.b. oven or port	
Sulphate of ammonia	$29.50

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	.....	19.38	25.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	.....	24.66	.....
Boston from Birmingham	25.87	.....	.....	.....
Boston from Everett, Mass.	26.25	26.75	25.75	27.25
Boston from Buffalo	26.25	26.75	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.78	.....
Cincinnati from Birmingham	24.06	.....	23.06	.....
Cleveland from Birmingham	24.32	.....	23.82	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.10
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	26.69	27.69
Newark, N. J., from Birmingham	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	26.45	26.45	25.95	25.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	24.55	24.55	24.05	.....
St. Louis from Birmingham	†24.12	.....	23.82	.....
St. Paul from Duluth	26.08	26.08	.....	26.58

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phil. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $102.50
Do., del. Pittsburgh 107.77

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 33.00
Do., New Orleans 33.00
Do., 26-28%, Palmerton 39.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman., 2½ carbon 106.50
2% carbon 111.50 1%, 121.50
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.70-1.75

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80

Ferrotitanium, c. l., prod. plant, frt. all., net ton 142.50
Contract, ton lots 145.00
Spot, ton lots 150.00

Ferrophosphorus, per ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. carlots 10.50
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.50c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40%, lb. con. ti., ton lots $1.23
Do, less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-55%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract carloads, f.o.b. Niagara Falls, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.80
Do, smaller lots 3.00-3.10

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, lb. 14.50c
Do, 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract, carloads, f.o.b. Niagara Falls, ton $74.00
Do, spot 79.00
Less-ton lots, lb. 4.25c

Manganese Briquets, contract carloads, f.o.b. Niagara Falls, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, carloads, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa., 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-In. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled No. 10	Sheets: Hot Roll Ann. No. 24	Sheets: Galv. No. 24
Boston	4.26	4.46	5.46	4.11	4.10	5.76	4.21	4.96	5.00
New York (Metropolitan)	4.16	4.36	4.36	4.02	3.99	5.62	4.11	4.50	4.75
Philadelphia	4.03	4.13	4.63	3.92	3.92	5.25	4.03	4.65	4.90
Baltimore	4.00	4.20	4.45	3.90	3.90	5.50	3.95	4.50	4.70
Norfolk, Va.	4.20	4.40	4.65	4.10	4.10	5.70	4.15	4.75	5.40
Buffalo	3.90	4.25	4.25	3.95	3.80	5.55	4.00	4.83	5.38
Pittsburgh	3.80	4.00	4.00	3.70	3.70	5.30	3.75	4.50	5.15
Cleveland	3.75	4.19	4.19	3.89	3.89	5.49	3.94	4.69	5.34
Detroit	3.94	4.19	4.19	3.98	3.98	5.58	3.94	4.69	5.43
Cincinnati	4.08	4.28	4.28	3.98	3.98	5.58	4.03	4.78	5.43
Chicago	3.85	4.10	4.10	3.75	3.75	5.35	3.85	4.60	5.25
Minneapolis	4.10	4.35	4.35	4.00	4.00	5.60	4.10	4.75	5.00
Milwaukee	3.96	4.21	4.21	3.86	3.86	5.46	3.96	4.71	5.36
St. Louis	4.12	4.37	4.37	4.02	4.02	5.62	4.12	4.87	5.52
Kansas City	4.40	4.65	4.65	4.30	4.30	5.90	4.10	4.85	5.50
Memphis	4.35	4.55	4.55	4.25	4.25	5.91	4.30	5.05	5.70
Chattanooga	4.25	4.45	4.45	4.15	4.15	5.98	4.20	4.10	4.70
Tulsa, Okla.	4.89	5.14	5.14	4.79	4.79	6.39	4.89	5.64	6.29
Birmingham, Ala.	3.85	4.05	4.05	3.75	3.75	6.03	3.80	4.55	5.20
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	4.75	5.15
Houston, Tex.	3.75	6.15	6.55	4.25	4.25	6.15	4.50	5.25	5.65
Seattle	4.45	4.95	6.30	4.25	4.25	6.00	4.50	5.35	5.90
Portland, Oreg.	4.45	4.95	6.30	4.25	4.25	6.00	4.50	5.15	5.90
Los Angeles	4.30	4.80	6.55	4.30	4.30	6.20	4.50	5.00	5.25
San Francisco	4.20	4.80	6.50	4.05	4.05	5.55	4.30	5.15	5.55

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars: 2300	3100
Boston	3.86	4.71	4.56	8.00	6.55	6.30	8.40	9.02	7.57
New York	3.91	4.61	4.36	7.84	6.39	6.14	9.54	9.04	7.59
Philadelphia	3.91	4.56	4.28	7.81	6.36	6.11	9.01	....	....
Baltimore	....	4.55	4.15	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.82	4.35	4.10	7.60	6.15	5.90	8.00	8.60	8.15
Pittsburgh	....	4.15	3.95	7.70	6.25	8.50	9.10	8.70	7.25
Cleveland	3.60	4.30	3.95	7.78	6.33	6.33	8.18	8.60	7.15
Detroit	3.80	4.30	4.09	7.92	6.47	6.22	7.74	8.90	7.45
Cincinnati	....	4.53	4.10	7.94	6.49	6.24	9.34	8.95	7.50
Chicago	3.91	4.30	4.05	7.60	6.15	5.90	8.00	8.60	7.15
Minneapolis	....	4.83	4.25	7.95	6.50	9.03	9.63	9.23	7.78
Milwaukee	....	4.41	4.16	7.81	6.36	6.11	8.21	8.81	7.36
St. Louis	4.01	4.57	4.32	7.97	6.52	6.27	8.37	8.97	7.52
Kansas City	4.46	4.85	....	....	....	....	....	....	....
Memphis	....	4.86	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.34	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.85	6.05	....	8.00	8.00	8.65	....	....
Portland, Oreg.	....	5.85	5.85	9.00	8.00	7.85	8.70	....	....
Los Angeles	5.96	6.85	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	9.30	6.80	5.20	9.65	8.80	8.65	9.30	10.65	9.80

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, May 26

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$27.22 5 10 0	$16.00	2 0 0
Basic bessemer	....	17.89	2 4 6
Hematite, Phos. .03-.05	32.18 6 10 0*	.....	.....
Billets	$38.98 7 17 6	$43.22	5 7 6
Wire rods, No. 5 gage	55.81 11 5 6	41.01	5 2 6
Standard rails	$50.12 10 2 6	$46.23	5 15 0
Merchant bars	2.44c 11 0 0	1.90c	5 5 0
Structural shapes	2.36c 10 12 6	1.77c	4 17 6
Plates, †¼ in. or 5 mm.	2.57c 11 11 3	2.23c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	3.11c 14 0 0	2.82c	7 15 0°
Sheets, gal., 24 ga., corr.	3.72c 16 15 0	3.45c	9 10 0
Bands and strips	2.94c 13 5 0	1.99c	5 10 0
Plain wire, base	4.35c 19 10 0	2.23c to 2.64c	6 2 6 to 7 5 0
Galvanized wire, base	5.17c 23 5 0	2.85c to 2.95c	7 17 6 to 8 2 6
Wire nails, base	4.11c 18 10 0	2.54c to 2.72c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$5.01 1 0 3	.....	.....

British ferromanganese $102.50 delivered Atlantic seaboard, duty-paid

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$26.98 5 9 0(a)	$16.56	598	$18.20	540	$25.30 63
Basic bess. pig iron	24.75 5 0 0(a)	.....	....	.....	...	27.91 (b) 69.50
Furnace coke	8.04 1 12 6	5.68	205	7.25	215	7.63 19
Billets	38.98 7 17 6	23.27	840	28.98	860	38.75 96.50
Standard rails	2.25c 10 2 6	1.50c	1,150	2.06c	1,375	2.38c 132
Merchant bars	2.71c 12 4 0††	1.40c	1,080	1.65c	1,100	1.98c 110
Structural shapes	2.45c 11 0 6††	1.37c	1,055	1.65c	1,100	1.93c 107
Plates, ††¼-in. or 5 mm.	2.60c 11 14 3††	1.76c	1,350	2.06c	1,375	2.29c 127
Sheets, black	3.50c 15 15 0§	2.03c	1,565‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.11c 18 10 0	2.93c	2,250	4.43c	2,950	6.66c 370
Plain wire	4.33c 19 10 0	2.16c	1,660	2.48c	1,650	3.11c 173
Bands and strips	2.87c 12 19 0††	1.57c	1,210	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 64.3 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	10.00
Bos. dock No. 1 exp.	10.00
N. Eng. del. No. 1	11.50
Buffalo, No. 1	10.50-11.00
Chicago, No. 1	10.50-11.00
Chicago, auto, no alloy	8.75- 9.25
Chicago, No. 2 auto	8.25- 8.75
Cincinnati	7.75- 8.25
Cleveland, No. 1	10.00-10.50
Cleveland, No. 2	9.00- 9.50
Detroit, No. 1	6.50- 7.00
Eastern Pa., No. 1	12.00-12.50
Eastern Pa., No. 2	10.00-10.50
Federal, Ill.	10.00-10.50
Granite City, R. R.	9.75-10.00
Granite City, No. 2	9.25- 9.75
Los Angeles, No. 1	11.50-12.00
Los Angeles, No. 2	10.50-11.00
New York, No. 1	†9.00
N. Y. dock No. 1 exp.	8.50
Pitts., No. 1 (R. R.)	12.75-13.25
Pitts., No. 1 (dlr.)	11.00-11.50
Pittsburgh, No. 2	10.00-10.50
St. Louis, R. R.	10.25-10.75
St. Louis, No. 2	9.25- 9.75
San Francisco, No. 1	12.00
Seattle, No. 1	10.00-12.00
Toronto, dlrs. No. 1	9.00
Valleys, No. 1	11.00-11.50

COMPRESSED SHEETS

Buffalo	8.50- 9.00
Chicago, factory	10.00-10.50
Chicago, dealer	8.50- 9.00
Cleveland	9.50-10.00
Detroit	7.00- 7.50
E. Pa., new mat.	12.00-12.50
E. Pa., old mat.	8.00- 8.50
Los Angeles	12.50-13.00
Pittsburgh	11.00-11.50
St. Louis	5.50- 6.00
Valleys	10.00-10.50
Cincinnati, del	7.25- 7.75

BUNDLED SHEETS

Buffalo, new	8.50- 9.00
Buffalo, old	7.50- 8.00
Cleveland	7.50- 8.00
Los Angeles	11.00-11.50
Pittsburgh	10.00-10.50
St. Louis	4.50- 5.00
Toronto, dealers	6.00

SHEET CLIPPINGS, LOOSE

Chicago	5.25- 5.75
Cincinnati	3.25- 3.75
Detroit	4.75- 5.25
†Los Angeles	3.75- 4.00
St. Louis	3.50- 4.00

STEEL RAILS, SHORT

Birmingham	15.00
Buffalo	15.50-16.00
Chicago (3 ft.)	13.00-13.50
Chicago (2 ft.)	13.50-14.00
Cincinnati, del.	15.00-15.75
Detroit	13.50-14.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	16.00-16.50
St. Louis, 2 ft. & less	13.00-13.50

STEEL RAILS, SCRAP

Boston district	†9.00
Buffalo	12.50-13.00
Chicago	11.00-11.50
Cleveland	14.00-14.50
Pittsburgh	15.00-15.50
St. Louis	11.25-11.75
Seattle	16.00

STOVE PLATE

Birmingham	8.00- 8.50
Boston district	†7.00
Buffalo	10.50-11.00
Chicago, net	7.50- 8.00
Cincinnati, dealers	4.75- 5.25
Detroit, net	7.50- 8.00
Eastern Pa.	10.50-11.00
New York, fdry.	†6.50- 7.00
St. Louis	6.75- 7.25
Toronto, dealers, net	8.00

SPRINGS

Buffalo	14.00-14.50
Chicago, coil	14.50-15.00
Chicago, leaf	14.00-14.50
Eastern Pa.	15.50-16.00
Pittsburgh	15.00-15.50
St. Louis	12.75-13.25

ANGLE BARS—STEEL

Chicago	12.00-12.50
St. Louis	11.00-11.50

RAILROAD SPECIALTIES

Chicago	13.00-13.50

LOW PHOSPHORUS

Buffalo, crops	14.50-15.00
Cleveland, crops	17.50-18.50
Eastern Pa., crops	16.00-16.50
Pittsburgh, crops	16.50-17.00

FROGS, SWITCHES

Chicago	11.00-11.50
St. Louis, cut	11.25-11.75

SHOVELING STEEL

Federal, Ill.	10.00-10.50
Granite City, Ill.	9.25- 9.75
Los Angeles	15.00-16.50
Toronto, dealers	7.00

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.00- 9.50
Chicago, No. 1 net	8.00- 8.50
Cincinnati, No. 2	7.75- 8.25
Eastern Pa., No. 1	13.50-14.00
St. Louis, No. 1	8.00- 8.50
St. Louis, No. 2	9.75-10.25
Toronto, No. 1 dlr.	15.00

SPECIFICATION PIPE

Eastern Pa.	12.00-12.50
New York	†6.50- 7.00

BUSHELING

Buffalo, No. 1	8.50- 9.00
Chicago, No. 1	9.00- 9.50
Cincin., No. 1, deal.	6.25- 6.75
Cincinnati, No. 2	2.00- 2.50
Cleveland, No. 2	5.00- 5.50
Detroit, No. 1, new	6.25- 6.75
Valleys, new, No. 1	10.00-10.50
Toronto, dealers	6.00

MACHINE TURNINGS (Long)

Birmingham	6.00- 7.00
Buffalo	4.50- 5.00
Chicago	4.50- 5.00
Cincinnati, dealers	2.25- 2.75
Cleveland	5.00- 5.50
Detroit	3.25- 3.75
Eastern Pa.	6.50
Los Angeles	4.00- 4.25
New York	†2.50- 3.00
Pittsburgh	6.50- 7.00
St. Louis	2.50- 3.00
Toronto, dealers	6.00
Valleys	7.00- 7.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	1.25
Buffalo	4.50- 5.00
Cincinnati, dealers	1.75- 2.25
Cleveland	5.00- 5.50
Eastern Pa.	6.00- 6.50
Detroit	3.75- 4.25
New York	†2.00- 2.50
Pittsburgh	6.00- 6.50
Toronto, dealers	6.50

CAST IRON BORINGS

Birmingham	6.00- 7.00
Boston dist. chem.	†5.00
Bos. dist. for mills	†6.00
Buffalo	4.00- 4.50
Chicago	4.75- 5.25
Cincinnati, dealers	1.75- 2.25
Cleveland	5.00- 5.50
Detroit	3.75- 4.25
E. Pa., chemical	10.00-11.00
New York	†3.00- 3.50
St. Louis	2.00- 2.50
Toronto, dealers	6.50

PIPE AND FLUES

Cincinnati, dealers	4.75- 5.25
Chicago, net	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	8.00- 8.50
Chicago, net	7.25- 7.75
Cincinnati	5.25- 5.75
Eastern Pa.	10.00-10.50
New York	†6.50- 7.00
St. Louis	7.00- 7.50

FORGE FLASHINGS

Boston district	†4.00
Buffalo	8.50- 9.00
Cleveland	10.00-10.50
Detroit	5.75- 6.25
Los Angeles	9.00
Pittsburgh	10.00-10.50

FORGE SCRAP

Boston district	†4.00
Chicago, heavy	14.00-14.50

ARCH BARS, TRANSOMS

St. Louis	12.00-12.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.00- 9.50
Chicago, elec. fur.	9.50-10.00
Eastern Pa.	9.50 10.00
St. Louis	8.00- 8.50
Toronto	7.00

STEEL CAR AXLES

Birmingham	16.00-17.00
Buffalo	15.50-16.00
Boston district	†14.00
Chicago, net	15.50-16.00
Eastern Pa.	21.50-22.50
St. Louis	17.00-17.50

SHAFTING

Boston district	†13.00-13.25
New York	†14.00-14.50
Eastern Pa.	18.00-18.50
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	14.00-15.00
Boston dist., iron	†8.25
Buffalo, steel	14.00-14.50
Chicago, iron	11.50-12.00
Chicago, rolled steel	13.00-13.50
Cincinnati, iron	12.00-12.50
Eastern Pa., iron	14.50-15.00
Eastern Pa., steel	15.50-16.00
Pittsburgh, iron	13.00-13.50
Pittsburgh, steel	15.00-15.50
St. Louis, iron	11.25-11.75
St. Louis, steel	12.75-13.25

NO. 1 CAST SCRAP

Birmingham	14.00-14.50
Boston, No. 1 mach.	†10.00
N. Eng. del. No. 2	8.50
N. Eng. del. textile	14.00-14.50
Buffalo, cupola	12.50-13.00
Buffalo, mach.	13.00-13.50
Chicago, agri. net	9.50-10.00
Chicago, auto	10.00-10.50
Chicago, railr'd net	10.00-10.50
Chicago, mach. net	10.50-11.00
Cincin., mach. cup.	9.75-10.25
Cleveland, mach.	14.00-14.50
Eastern Pa., cupola	14.50-15.00
E. Pa., mixed yard	11.50-12.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	13.50-14.00
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, No. 1	10.50-11.00
St. L., No. 1, mach.	12.25-12.75
Toronto, No. 1, mach., net	11.50

HEAVY CAST

Boston dist. break.	†7.00- 7.25
New England, del.	10.50-11.00
Buffalo, break.	10.00-10.50
Cleveland, break.	13.00-14.00
Detroit, break.	10.00-10.50
Detroit, auto net	11.00-11.50
Eastern Pa.	12.50-13.00
Los Ang., auto, net	13.00-13.50
New York, break.	†8.00- 8.50
Pittsburgh, break.	11.00-11.50

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del.	16.00
Buffalo	12.00-12.50
Chicago, R. R.	11.25-11.75
Cincin., agri. del.	9.00- 9.50
Cleveland, rail	13.50-14.00
Detroit, auto	10.00-10.50
Eastern Pa., R. R.	14.00-14.50
Los Angeles	17.50-18.00
Pittsburgh, rail	14.00-14.50
St. Louis, R. R.	10.00-10.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-17.00
Boston	†9.50
Chicago	14.50-15.00
Eastern Pa.	16.00-16.50
New York	†14.00-14.50
St. Louis	13.25-13.75

LOCOMOTIVE TIRES

Chicago (cut)	13.50-14.00
St. Louis, No. 1	12.00-12.50

LOW PHOS. PUNCHINGS

Buffalo	14.50-15.00
Chicago	13.50-14.00
Eastern Pa.	16.00-16.50
Pitts. (light & hvy.)	15.00-15.50
Seattle	15.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00-13.00
No. Afr. low phos.	nominal
Swedish low phos.	17.00-18.00
Spanish No. Africa basic, 50 to 60% nom.	12.00
Tungsten, sh. ton. unit, duty pd. nom.	$15.75
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$25.50-26.50
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	nom. 45.00
So. African, 50-52%	nom. 45.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 66

Pittsburgh—There is little demand for sheets from any source and production has dropped off slightly to around 34 per cent of capacity on common black and full finished, with the galvanized rate estimated at 38 per cent. No announcement has yet been made on galvanized sheet prices and it is not expected before the middle of this week at the earliest. Some confusion is still seen in application of the new price cards in hot-rolled and cold-rolled sheets, with consumers studying the new rates closely in view of the policy of companies to supply sheets under either new or old rates, whichever is the lower.

New York — As consumers gain better understanding of price changes recently announced in hot and cold sheets orders are coming out somewhat more freely. However, the general outlook for several weeks lacks promise, as most consumers other than those in the building field, see little ahead until at least next fall.

Philadelphia — Consumers are reacting favorably to the revisions in sheet schedules but are placing no more business than needs dictate. Some stamping plants are re-figuring work based on the new setup. Weirton Steel Co. has been awarded approximately 425 tons of sheets by Lewisburg prison, including 12,000 pounds of 14-gage hot-rolled annealed, 40 x 90 inches, at 2.85c; 20,550 pounds 18 gage hot-rolled annealed, 27¼ x 108 inches, at 3.35c; 117,800 pounds, same, except 39¼ x 108 inches, at 3.175c; 19,200 pounds 22 gage hot-rolled pickled annealed, coated with Paralan, 25½ x 102 inches, at 3.60c; 46,600 pounds, same except 27 x 83 inches, also at 3.60c, and 16,000 pounds same except 26 gage and 25 x 96 inches, at 4.00c. Quotations were fairly uniform with the exception that some bidders quoted $2 a ton higher on certain items, totaling 25 in aggregate. Hill-Chase Co., Philadelphia, was awarded nine stainless steel items, including 17-7 12-gage sheet, 48 x 150 inches, at 48.34c and 14 gage material, 36 x 64 inches, at 50.34c.

Boston—Sheet buying is light and spotty. Full car orders are few. While jobbers are buying more frequently than earlier in the year, average shipments are smaller than usual and larger industrial fabricators, operating at low rates, are buying close to immediate needs. Most volume in cold finished sheets is often in seconds or rejects sold in this district to toy-makers and some warehouses seeking volume on a strictly price basis. Prices on such material vary considerably.

Cleveland—Specifications for hot and cold-rolled sheets have shown no stimulating influences from third quarter price announcements. It is said this is due to the confusion that exists because most mills have not had the time to get revised extra lists in the hands of customers.

Chicago—New price schedules on sheets, including revised differentials and extras, result in both advances and reductions in net prices of various sizes. Sheet buying continues slow and while little change is shown from the April volume, the tendency still is slightly downward.

St. Louis—Demand for sheets is reported barely steady. The new list of extras and deductions has had no appreciable effect on consumers and are expected to cause little change in net quotations. The feeling in corrugated roofing material is somewhat easier, but lighter gages of galvanized sheets are steady, with demand from manufacturers slightly better than a month ago. Movement to the stove industry is well sustained, including enameling stock and light material for stovepipe.

Cincinnati — District sheet mills, preparing formal announcements of third quarter prices, opened books for the quarter with quotations in accord with revisions made by other companies. Demand continues broad and shows most inventories low. Volume tends to taper on seasonal influences. Tonnage for export and for automobile builders has diminished.

Birmingham, Ala.—Manufacturers' sheets continue somewhat in demand, in contrast to little buying in roofing and drum sheet stocks. A spotty market continues for sheets generally.

Strip

Strip Prices, Page 67

Cleveland — Sellers note little change in orders. Consumers continue to order only when they are in actual need. Reduction in price of cold-rolled strip to compensate for a similar reduction in cold-rolled sheets has failed to drive in any material volume of additional tonnage. Requirements from stove, refrigerator, radio and other household equipment manufacturers continue generally light. Demand from auto partsmakers is dormant.

Boston — Reduction in cold-rolled strip of $2 a ton to 3.30c, Worcester, has not resulted in better demand, some consumers being confused as to extras and details. With these more clearly understood, some improvement is expected and a mildly better demand for hot strip. The low point to which many consumers have allowed stocks to fall would indicate an immediate reaction to even moderate improvement in business.

New York — Narrow cold strip buying is slack, a few sellers noting a slight gain in miscellaneous manufacturing trade demand. Most larger consumers, however, are out of the market. Due to a lack of understanding regarding new prices and extras for a few days, buying slumped. Mill operations are generally unchanged.

Philadelphia — Narrow strip inventories show further reduction but consumers show no inclination to come into the market for other than needed gages and widths for specified work.

Pittsburgh—Slight downward revision has been made in cold-rolled strip production and it is now estimated at around 22 per cent of capacity. No change has been noted in the hot-rolled figure and it is still holding at about 20 per cent. Demand is practically at bottom, with only absolute necessities being filled at present. It is expected the commodity cold-rolled strip price announcement will be made shortly, possibly the middle of this week. No orders had been received directly attributable to the revision in cold strip prices announced last week.

Chicago—Former extras and differentials apparently will be continued on cold-rolled strip, together with a reduction of $2 a ton in base price. Some producers still are awaiting clarification of the price situation before issuing new schedules but changes previously announced are expected to become applicable. Business is fairly steady but continues at a slow rate, with little change in early prospect.

Birmingham, Ala.—Strip mills still are looking forward to July, when a pickup is expected because of the cotton tie season. Business continues dull at present.

Shape Import Price Cut

Philadelphia — Steel imports during the week ended May 21 were confined to 145 tons from Sweden. Included were: 11 tons of wire rod, 62 tons of steel tubes, 51 tons of steel forgings and 21 tons of steel bars.

According to reports, offerings of foreign steel are somewhat heavier. Structural shapes have been offered

at 2.10c and 2.15c, delivered. Shape imports so far this month total 204 tons, all from Belgium.

Plates

Plate Prices, Page 66

Pittsburgh — Plate buying is in small lots with few large projects now in the market. Requirements of railroads are still small, although some barge construction is under way. Dravo Corp., Pittsburgh, is low bidder on 1840 tons of plates for the Chickamauga dam of the TVA project. The Dravo company also announces that the first of five large cargo barges is nearing completion and will soon be launched. These barges are being built for Inland Waterways Corp.

New York — Demand for plates is light with no action yet on material for Southern railway freight cars, due to delay by the interstate commerce commission in appriving awards. Ship work is promising but has resulted in few specifications here.

Boston—Oil tanks, taking 1055 tons, of which 430 tons have been placed, lifts specified requirements for plates materially. Of the unplaced tonnage, 420 tons are for an East Boston, Mass., distributor and 225 tons for Bangor, Me. Bethlehem Steel Co. has booked two trawlers for a Boston fish company, taking 200 tons, to be built at Quincy, Mass. Indications are the Quincy yard will also get the four American Export Lines cargo boats, increasing the shipbuilding industry in this district by 14,000 tons. Electric Boat Co., Groton, Conn., recently laid a submarine keel and will follow with another within a few weeks. Except for oil tanks and shipping, plate buying is on a hand-to-mouth basis in small miscellaneous lots.

Cleveland — Requirements for standard steel plates failed to show material improvement in May. The fact that prices have been announced unchanged for third quarter has done little in stimulating demand. Some sellers report the number of inquiries has shown a slight improvement recently. Chicago Bridge & Iron Co., Chicago, is reported low on the second standpipe project for the city of Akron, O., involving 300 tons.

Philadelphia — Plate buying shows no further decline but has failed to improve to any extent. Operations of some independent plate mills are well sustained with one continuing to operate five furnaces and another may add a third. Some encouragement is being derived from business coming indirectly from the oil industry for tanks, pressure vessels, etc. No new ship releases are reported. Railroads still show no interest locally. Cornwall Railroad Co. will buy seven 70-ton hopper cars, it is reported. The Virginian has awarded a contract to Ross & White, Chicago, for construction of four automatic engine coalers, two cinder handling plants and four 10-ton steel storage towers for Roanoke and Victoria, Va.

Birmingham, Ala.—Plate mill operators are awaiting start on the Southern railway order for 2000 cars, which will substantially lift the present restricted production of plates. Otherwise, orders are somewhat above last week, but probably on a temporary basis.

San Francisco — Activity in the plate market is far from pronounced and pending business is limited to small lots. Steel Tank & Pipe Co. secured the largest award in over two months, 718 tons of 36-inch welded steel pipe for the East Bay municipal utility district, Oakland, Calif. To date this year 14,046 tons have been placed, compared with 24,999 tons for the same period a year ago.

Plate Contracts Placed

1766 tons, 12,000 feet of 36-inch and 8000 feet of 30-inch steel pipe, Brookpark water main project, Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.

843 tons, 25 and 16-inch welded steel pipe, East Bay municipal utility district, Oakland, Calif., allocated as follows: 718 tons 36-inch pipe to Steel Tank & Pipe Co., Berkeley, Calif., and 125 tons 25-inch pipe to California Corrugated Culvert Co., Berkeley, Calif.

570 tons, roof supports, eight tanks, Humble Pipe Line Co., Fendren, Tex., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

200 tons, two trawlers, to Bethlehem Shipbuilding Co., Quincy, Mass.

185 tons, oil tanks, Atlantic Refining Co., Providence, R. I., and New Haven, Conn., to Chicago Bridge & Iron Co., Chicago.

Plate Contracts Pending

750 tons for seven 110-foot harbor cutters; bids June 15 to coast guard, Washington.

300 tons, standpipe, for city of Akron, O.; Chicago Bridge & Iron Co., Chicago, low; bids May 17.

Unstated tonnage, one 65½-foot steel diesel-driven tugboat, U. S. engineer, Philadelphia, American Car & Foundry Co., New York, low, both riveted and welded construction, bidding from $53,206 to $59,146, delivery 170 days, bids May 24.

Unstated tonnage, four 35-foot steel workboats, U. S. engineer, Memphis, Tenn.; Hans Hansen Welding Co., Toledo, O., low, at $26,228.92, delivered U. S. supply and repair depot, Bridge Junction, Ark., bids May 16.

Bars

Bar Prices, Page 66

Pittsburgh — Requirements for commercial and alloy steel bars are down slightly from April and it seems apparent the total tonnage for May will be somewhat less. Current orders are light and no hopeful signs have appeared. Although it was believed part of the present letdown was due to deferring of buying previous to third-quarter price announcements, no orders have been received since the announcement which can be said to have resulted from the action. Buying is still of fill-in variety and only for immediate needs.

New York — The slight flurry in buying of commercial bars which succeeded reaffirmation of prices for third quarter has subsided, with sellers reporting incoming tonnage about on a parity with that of a few weeks ago or slightly under. Railroad demand also is negligible, pending formal award of requirements of the Southern Railway car list.

Boston—Although a car-lot order for cold finished bars appears now and then, most buying is for fill-in needs, with numerous consumers showing more interest in moving their own stocks of finished goods than in new steel requirements. Demand for alloy bars is fair but forging bars are slightly less active. Marine hardware builders, busier than usual in recent weeks, are somewhat less active. Most larger users are buying sparingly.

Philadelphia — Commercial bar business is close to the levels of the past two or three weeks and is fairly well diversified, which is taken to indicate dwindling inventories. Prices are steady. Carnegie-Illinois Steel Corp. has been awarded approximately 75 tons of strip, bars and angles by Lewisburg prison. Included were 40,200 pounds of hot-rolled steel angles at 2.85c. Maryland Steel Products Co., Baltimore, was awarded 1280 pounds, same type material in smaller sections at 3.69c compared with 3.85c submitted by three other bidders.

Cleveland—Sellers of carbon and alloy steel bars find little change in current requirements. Shipments for May are expected to be substantially the same as in April, although in a few instances a slight reduction is noted. Demand from auto partsmakers is negligible.

Birmingham, Ala.—With prices generally weak, orders for merchant bars are scattered and little tonnage is moving. Concrete bars for federal projects are in good demand.

—The Market Week—

Pipe

Pipe Prices, Page 67

Chicago—Little change is noted in demand for cast iron pipe. WPA projects call for small lots occasionally, but release of further government funds is looked for before business increases appreciably. Possibility of the Chicago subway work being started soon indicates to some quarters that a demand for pipe replacements will involve considerable tonnage.

Boston—A moderate improvement in steel pipe buying includes several hundred tons for buildings, including requirements for the Massachusetts General hospital building, estimated at eight car-loads. A smaller tonnage of 8-inch steel pipe for the Manchester, N. H., Gas Co. was placed with a Pittsburgh mill. Through resellers merchant steel pipe is moving in steady volume in small lots. Wrought iron pipe prices are reaffirmed with buying a shade better. Cast pipe demand is still active, although the seasonal peak has passed with shipments brisk. Boston will probably inquire for a fairly large cast pipe tonnage next month.

Utility purchases, except for special fittings, are still meager. New England Power Co. and Blackstone Gas & Electric Co., bought slightly better than 100 tons of small-diameter gas pipe from the Everett, Mass., foundry.

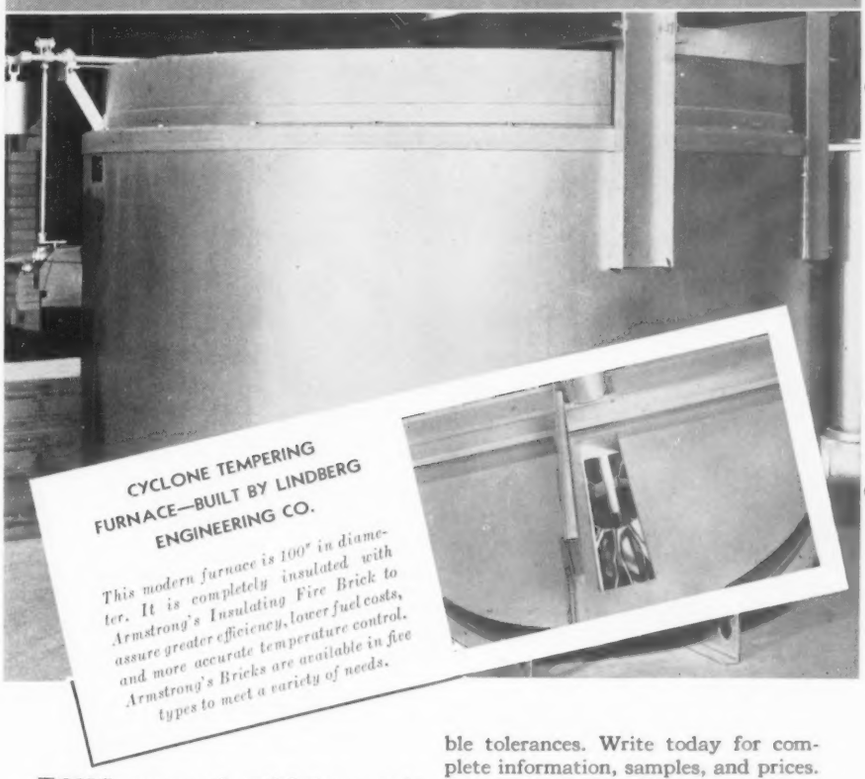
Cleveland — Industrial requirements for standard steel pipe out of jobbers' stocks remains substantially unchanged. No material improvement is expected soon. Bethlehem Steel Co., Bethlehem, Pa., is reported to have received the general contract for the Brookpark water main, Cleveland, involving 1766 tons of 36 and 30-inch steel pipe. A new intake for the city of Sandusky, O., involving 3000 feet of 42-inch steel pipe and 17,000 feet of 20 and 24-inch cast pipe is still pending. Prices remain firm.

Pittsburgh — Pipe and tubular goods market is still unchanged with operations at 35 to 40 per cent of capacity. Little change is expected soon as nothing has come out involving any increase in standard pipe and the tubular goods division remains unchanged. Oil country goods account for the most substantial part of present market.

San Francisco—Interest in cast iron pipe centers around outcome of bids just opened on 1900 tons of 4 to 16-inch, class 150 pipe for the East Bay municipal utility district, Oakland, Calif., on which United States Pipe & Foundry Co. was low

FUEL SAVED... ECONOMY ASSURED

when leading furnace builders insulate with Armstrong's Brick



CYCLONE TEMPERING FURNACE—BUILT BY LINDBERG ENGINEERING CO.

This modern furnace is 100" in diameter. It is completely insulated with Armstrong's Insulating Fire Brick to assure greater efficiency, lower fuel costs, and more accurate temperature control. Armstrong's Bricks are available in five types to meet a variety of needs.

LONG years of satisfactory and economical operation in furnaces of all types, have won for Armstrong's Insulating Fire Brick an enviable reputation among leading furnace builders and plant supervisors.

Use of Armstrong's Insulating Fire Brick permits thinner furnace walls and consequent larger hearth area. The high crushing strength of these efficient brick makes them particularly adaptable for arch work. And because they possess exceptionally low heat capacity, they permit the furnace to come to temperature more quickly and to maintain more uniform temperatures. Armstrong's Brick are available in five types to meet a variety of needs.

For engineers wishing to make open specifications for high temperature insulation, Armstrong will gladly furnish complete specifications outlining the standards required for the different physical characteristics with permissible tolerances. Write today for complete information, samples, and prices. Armstrong Cork Products Company, Building Materials Division, 985 Concord St., Lancaster, Pennsylvania.

IMPORTANT FEATURES

1. Ample insulating value
2. High crushing strength
3. Accurate sizing
4. High spalling resistance
5. High salvage value
6. Complete line for wide temperature range
7. Ability to withstand handling in shipping and installing
8. Special shapes of all types and sizes
9. Easily cut on the job
10. Stocks available in principal cities
11. Laying cements with same physical characteristics as brick
12. Complete line of refractory facing cements

Armstrong's

HIGH TEMPERATURE INSULATION

INSULATING FIRE BRICK · HIGH TEMPERATURE BLOCK
PLASTIC CEMENTS · DIATOMACEOUS EARTHS

on 1500 tons and American Cast Iron Pipe Co. low on 400 tons of 8-inch pipe. Awards for the year now 10,746 tons, compared with 16,117 tons for the same period last year.

Seattle—New projects are slow in developing but recent allocations of federal funds are expected to bring considerable volume of new business up for figures within 60 days. Meanwhile inquiry is slack. No important projects are up at the moment. Spokane has WPA approval for a system improvement involving $79,105 for materials. Quincy, Wash., has plans for a storage tank and new mains to cost $30,000.

Birmingham, Ala.—Cast pipe production continues on a hand-to-mouth basis, with possibly some decline in scattered spot business since last week. The work week generally is on a three-day basis.

Steel Pipe Placed

3000 tons, 8-inch 50 mile gas line, running from Fostoria to Lima, O., for Standard Oil Co. of Ohio, divided evenly with Republic Steel Corp., Cleveland, and National Tube Co., Lorain, O.

Cast Pipe Pending

10,970 tons 6 to 20-inch cement lined; bids June 2 to department of purchases, New York, on 2000 tons of 6 to 12-inch and 193 tons fittings, remainder to be bid about June 15.

1900 tons, 4 to 16-inch, class 150, East Bay municipal utility district, Oakland, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low on 1500 tons and American Cast Iron Pipe Co., Birmingham, Ala., low on 400 tons.

Wire

Wire Prices, Page 67

Cleveland—Demand for merchant wire products continues to reflect a gradual easing in orders from agricultural centers. However, some sellers report bookings still exceed by a substantial margin the demand for manufacturers' wire. The latter product has been hard hit by low operations among auto partsmakers and a number of other manufacturing lines in this district.

New York — Except for a mild improvement in buying by a few manufacturing industries, mostly smaller consumers, demand for wire is unchanged and spotty. There has also been a moderate demand in chain link fencing for New York city work and a substantial tonnage for enclosing the world's fair site went to Cyclone Fence Co. Spring and other wire for the automobile trade is slow.

Boston — Wire buying continues light, reaffirming of prices for third quarter not having any material effect on demand. Orders are for small lots for prompt delivery and some producers claim such orders are less numerous, with some decline in spotty finishing operations.

Pittsburgh — The wire market has shown little change for some time, with manufacturers' wire orders holding fairly steady. Merchant wire specifications are slow and may not revive before fall. May production is still slack and will be less than that of April. Prices are generally firm and in view of the light demand, no pressure has been exerted for any change.

Chicago — Demand has shown a slight increase but seasonal improvement has been below expectations. Farm needs are still a relatively important factor, but automotive and farm equipment demand has tapered. Continuation of prices into third quarter has brought no change in demand generally.

Rails, Cars

Track Material Prices, Page 67

Sellers of car steel see little ahead over the next few weeks apart from the heavy tonnage still pending for the Southern Railway equipment. New inquiry is negligible and such orders as are now being placed are limited to relatively few cars. While well below normal, there is a fair sprinkling of motor bus orders.

A few western railroad shops are reopening after extended shutdowns but for only a moderate amount of repair work, involving small tonnages of steel. Purchases for new equipment are light and track material orders also are scant. Rail mill operations continue on a restricted basis and mills need additional tonnages.

Columbia Steel Co., San Francisco, on a qualified bid, is apparently low bidder on 275 tons of 110-pound girder rails for the municipal railway, San Francisco.

Car Orders Placed

United Fruit Co., Boston, ten 7500-gallon tank cars, to Magor Car Corp., Passaic, N. J., for shipment to Guatemala.

Locomotives Placed

Boston & Maine, one diesel-electric switch engine of 600 horsepower, to American Locomotive Co., New York.

Portland Terminal Co., Portland, Me., one diesel-electric switch engine of 600 horsepower to American Locomotive Co., New York.

Buses Booked

American Car & Foundry Motors Co., New York: Five 35-passenger for Virginia Electric & Power Co., Richmond, Va.; three 37-passenger for Vermont Transit Co., Burlington, Vt.; one 35-passenger for New York State Railways, Utica, N. Y.; seventy-five 35-passenger for Brooklyn Bus Corp., New York.

J. G. Brill Co., Philadelphia: Twenty-eight 40-passenger trolley coaches for Des Moines Railway Co., Des Moines, Iowa.

Twin Coach Co., Kent, O.: Twenty-six 23-passenger and fourteen 31-passenger for Tacoma Light & Power Co., Tacoma, Wash.; seven 27-passenger for Galveston Electric Co., Galveston, Tex.; four 25-passenger for Pacific Gas & Electric Co., San Francisco; three 33-passenger for Trackless Transit Co. of New Jersey, East Orange, N. J.; two 30-passenger for Penn-Ohio Coach Lines, Youngstown, O.

Rail Orders Pending

600 tons, Erie railroad, Cleveland; in addition to 10,967 tons recently placed.

Shapes

Structural Shape Prices, Page 66

Chicago — Inquiries are heavier than for several weeks. Outstanding item involves 2000 tons for four Union Pacific bridges in southern California. TVA power house at Hobbs Island, Ala., requires 1200 tons, a bridge, Oklahoma City, Okla., 1100 tons. Closing date for bids on 3000 tons, Pensacola dam, Okla., has been postponed to June 17. Smaller inquiries are not as numerous as last week but involve more tonnage.

Boston — Most projects pending take small tonnages, an exception being a railroad machine shop, Everett, Mass., 1500 tons. Awards include 377 tons for Vermont bridges, cleaning up pending requirements in that state. Only a small part of 235 tons for Maine bridges out for bids has been placed. All these are small spans. Private industrial and commercial building is at a low ebb.

Philadelphia — Virginia Bridge & Iron Co., Roanoke, Va., has been awarded 1000 tons for a sodium plant for E. I. du Pont de Nemours & Co. at Baton Rouge, La. Fort Pitt Bridge Works, Pittsburgh, has taken a 190-ton brewery addition for the Hohenadel Brewing Co., Philadelphia. Contractors are taking steel bids May 31 on the Charles Edwin Fox memorial building, Philadelphia, taking about 100 tons. A few small private and public jobs are before the trade but the outlook is none too encouraging.

Orders for fabricated structural steel booked during April were in the largest volume of any month this year, according to American In-

stitute of Steel Construction. The orders showed an increase for the second consecutive month, amounting in April to 39.4 per cent of normal (yearly average, 1928-31). Orders for the first four months this year were 33.5 per cent of normal. Shipments during April totaled 40.2 per cent of normal, these having declined from 44.2 per cent during March. Totals for the month were: Shipments, 93,935; bookings, 92,130 tons.

Buffalo—That the tapering in activity might encounter resistance in the near future was indicated by the appearance of several new jobs of moderate size expected to be bid soon. Plans are underway for construction of a new span, calling for approximately 4000 tons, to replace the recently collapsed Falls View bridge. Curtiss Aeroplane & Motor Co., Buffalo, is contemplating early erection of a new assembly plant here.

Cleveland—The structural market has failed to register any tangible improvement following the third quarter price announcement. Current awards are limited to small tonnages from private sources. Considerable tonnage involved in the proposed Y. M. C. A. building at Youngstown, O., and a new bottling plant for the Coca-Cola Co., at Toledo, O., is still pending. Fabricated prices are generally unsettled.

Pittsburgh — Structural contracts are few and few new projects are appearing. Small jobs of less than 100 tons are fairly numerous, but larger orders are quite slow.

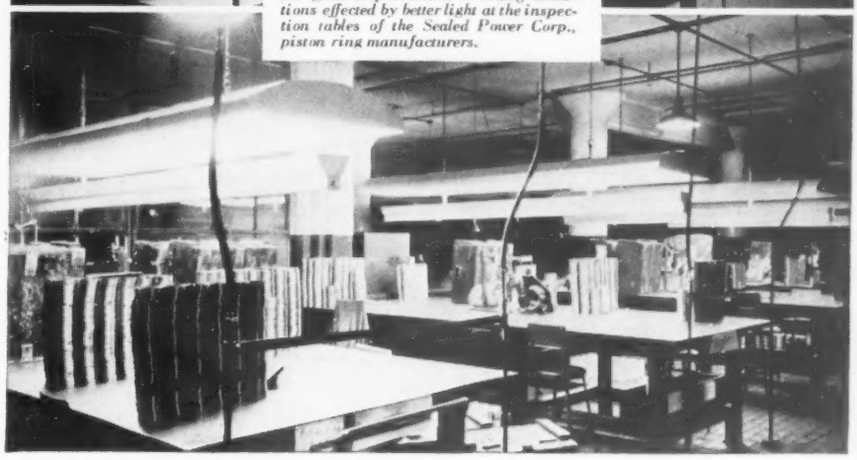
San Francisco — Demand for structural shapes is practically at a standstill. The only award of size, 154 tons, for a bridge in Mineral and Archuleta counties, Colorado, went to an unnamed interest. Pending business does not exceed 4800 tons. So far this year 44,826 tons have been booked compared with 96,629 tons in 1937.

Seattle—Business continues slow, most inquiry coming from public works. Tonnages pending are small

Shape Awards Compared

	Tons
Week ended May 28	**6,550**
Week ended May 21	**9,110**
Week ended May 14	**14,576**
This week, 1937	**15,660**
Weekly average, year, 1937	**16,060**
Weekly average, 1938	**15,443**
Weekly average, April	**24,340**
Total to date, 1937	**573,048**
Total to date, 1938.....	**335,740**

Includes awards of 100 tons or more.



"Before" and "after" photos show the great improvement in seeing conditions effected by better light at the inspection tables of the Sealed Power Corp., piston ring manufacturers.

HOW BETTER LIGHTING SPEEDS PISTON RING INSPECTION FOR SEALED POWER CORPORATION

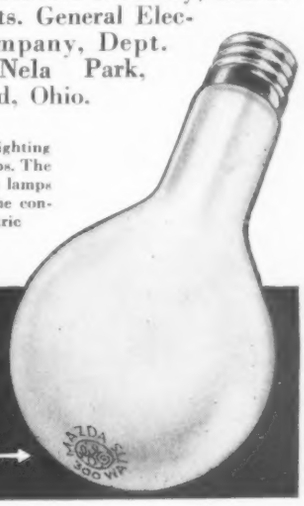
THE Sealed Power Corp. of Muskegon, Mich., one of the world's largest piston ring manufacturers, is using better lighting to disclose piston ring faults at its inspection tables. These faults were mainly of two kinds: pitting, scratching or uneven surface on any part of the ring, and the inability of the piston ring to lie perfectly flat on an even surface.

To reveal these faults, a high level of glare-free light was required over a relatively large area. Lighting engineers solved the problem satisfactorily by recommending Curtis Light Hoods equipped with Edison MAZDA lamps, directly over the center of inspection tables and 28 inches from the surface.

Today, 80-footcandles of soft, glareless light helps show up piston ring faults in less time and so speeds up inspections.

Your local lighting company will gladly measure the light in your plant with a Light Meter and recommend ways of improving it to help you improve employee morale, increase efficiency, and reduce costs. General Electric Company, Dept. 166-S, Nela Park, Cleveland, Ohio.

NEW G-E BULBS GIVE MORE LIGHT. To get all the light your lighting system was designed to provide, be sure to use only good lamp bulbs. The new, brighter Edison MAZDA lamps give more light than the same size lamps of a year ago without using any additional current. This is because the constant improvement and technical development made in General Electric research laboratories is continually raising the efficiency of G-E bulbs year after year.



EDISON MAZDA LAMPS

GENERAL ELECTRIC

They stay brighter longer →

and no important projects are up for figures. Business pending includes 1000 tons for 8 spillway gates at Coulee dam, Pacific Car & Foundry Co., Seattle, low.

Shape Contracts Placed

1285 tons, bridge Sec. 1F, Lacon, Marshall county, Indiana, to Illinois Steel Bridge Co., Jacksonville, Ill.

425 tons, building, Y. M. C. A., Hartford, Conn., to Bethlehem Fabricators Inc., Bethlehem, Pa.

410 tons, state bridge FAGM-1, Lincoln, Nebr., to Bethlehem Steel Co., Bethlehem, Pa.

375 tons, unit 1, Fulton fish market, New York, to Lehigh Structural Steel Co., Allentown, Pa.; through A. J. Paretta Co., Long Island City, N. Y.

285 tons, apartment building, Buffalo, to R. S. McMannus Steel Corporation Co., Buffalo.

282 tons, Burt bridge, FAS-SS-38-6, Niagara county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Earl L. Harrington, Buffalo, general contractor, $86,822.10, bids April 23.

280 tons, curb angles, procurement division, treasury department, New York, to American Bridge Co., Pittsburgh.

250 tons, shapes and joists, Moscow, Idaho, high school, reported to Truscon Steel Co., Portland; Colonial Construction Co., Spokane, general contractor.

240 tons, high school, Iowa City, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh; Paul Steenburg Construction Co., St. Paul, Minn., general contractor.

237 tons, three span I-beam bridge, Bennington, Vt., to American Bridge Co., Pittsburgh; through Carlo Bianchi & Co. Inc., Framingham, Mass.

210 tons, state highway bridges RC-3950, Foestport, N. Y., to Harris Structural Steel Co., New York.

210 tons, treater and cracker heater buildings, Sun Oil Co., Toledo, O., to Pittsburgh Bridge & Iron Co., Rochester, Pa.

210 tons, state bridge, RC-3941, Ulster county, New York, to Ingalls Iron Works Co., Birmingham, Ala.

200 tons, bridge, contract 1618, Knightstown, Ind., to Pan-American Bridge Co., New Castle, Ind.

190 tons, steam power plant, Northern Paper Mills, Green Bay, Wis., to Worden-Allen Co., Milwaukee.

170 tons, warehouse, Procter & Gamble Co., Baltimore, to Belmont Iron Works, Philadelphia.

160 tons, bridge RC-1396, Philippi, W. Va., to Ingalls Iron Works, Birmingham, Ala.

154 tons, bridge, Mineral and Archuleta county, Colorado, to unnamed interest.

140 tons, Bondville bridge, Jamaica, Vt., and Rawsonville bridge, Winhall, Vt., to Vermont Structural Steel Corp., Burlington, Vt.; Sawyer & Swett, Winchester, N. H., general contractor, $35,740.35, bids May 13.

135 tons, additions to schools, board of education, Winchester Ky., to Bedford Foundry & Machine Co., Bedford, Ind.

132 tons, state bridge 1619-B, Buckskin, Ind., to Vincennes Steel Corp., Vincennes, Ind.

130 tons, beam span, Niagara street, Buffalo, to Carnegie-Illinois Steel Corp., Pittsburgh.

125 tons, state bridge, RC-2513, Chenango county, New York, to Lackawanna Steel Construction Corp., Buffalo; through Harrison & Burrowes Inc., Jersey City, N. J.

115 tons, Comstock bridge, Ely, Vt., to American Bridge Co., Pittsburgh.

100 tons, bridge, contract 1616, Dunreith, Ind., to Central States Bridge & Structural Co., Indianapolis, Ind.

100 tons, sewage pumping station, Springfield, Mass., to Stafford Iron Works Co., Worcester, Mass.; Fred T. Ley & Co., Springfield, Mass., general contractor.

Shape Contracts Pending

4000 tons, estimated for bridge to be built by the International Railway Co., Buffalo, to replace recently collapsed Falls View bridge; Montserrat & Pratley, Montreal, and Modjeski & Martin, Philadelphia, engineers.

2250 tons, French government building, world's fair, New York.

2000 tons, four bridges, Union Pacific railroad; bids May 31.

1200 tons, TVA power house, Hobbs Island, Ala.

1100 tons, bridge, Oklahoma City, Okla.

770 tons, steel sheet piling, breakwater development, Fairport, O., for the U. S. Government engineers; bids June 9.

700 tons, piling, bulkhead North beach airport, Flushing Bay, N. Y.; Madden & Lane, New York, low.

700 tons, high school, Wauwatosa, Wis.; bids close June 2.

524 tons, bridge, San Saba county, Tex.

425 tons, stop logs and lifting beams, U. S. government, Fort Peck dam, Montana.

400 tons, alterations, telephone building, East Thirty-seventh street, New York; John Lowry Co., New York, general contractor.

370 tons, log stocks stop, Fort Peck dam, Wiota, Mont.

350 tons, building, Westinghouse Electric & Mfg. Co., world's fair, New York.

300 tons, extension, Gable street power plant, Houston, Tex.

270 tons, veterans' administration building, Murfreesboro, Tenn.

220 tons, factory and office building, Great Lakes Coca Cola Co., Toledo, O.

200 tons, subway carrying Chicago, Milwaukee, St. Paul & Pacific railroad tracks, state highway 19, Jefferson county, Wisconsin, for state.

200 tons, school, Rushville, N. Y., Werner-Spitz, Rochester, N. Y., low.

190 tons, state bridge over Licking river, Cynthiana, Ky.

190 tons, state overhead crossing, Shelby, Mont.

166 tons, crossing, Shelby, Mont.; bids opened.

150 tons, state highway bridge RC-3959, Essex county, New York.

150 tons, state highway bridge RC-3956, Cattauraugus county, New York.

140 tons, state bridge, Archie, Mo.

130 tons, school building, Burlington, Iowa.

115 tons, highway work, Pitkin county, Colorado; bids June 2.

108 tons, two 84-foot spans, web-flanged bridge, Stowe, Vt.; bids June 10, H. E. Sargent, commissioner of highways, Montpelier. Other highway and bridge work closing same date takes 100 tons, shapes and bars, mostly for two I-beam bridges, Westford-Underhill, Vt.

100 tons, Charles Edwin Fox memorial building, Philadelphia; bids May 31.

100 tons, addition to Art institute building, Chicago.

Unstated, Oregon highway projects including two crossings at Portland and Trask river bridge, Tillamook county; bids at Portland June 2 and 3.

Reinforcing

Reinforcing Bar Prices, Page 67

Chicago—Price cutting on concrete bars is more general here, concessions of $10 a ton being not uncommon. Reductions have been given on purchases of a few tons as well as on larger lots. Business is slow, some interests reporting recent conditions quieter than in 1932-33. State of Illinois will take new bids on about 1500 tons for road work, original bids having been rejected.

New York — Purchases of 1200 tons of highway mesh feature the market, material being for New York state roads. Of the tonnage involved in the May 17 opening at Albany, 769 tons still pend. Irregular prices are frequently noted.

Boston — Contract for 350 tons, sewage pumping station, Springfield, Mass., has been placed with an Albany, N. Y., distributor, Buffalo Steel Co., to furnish bars. Awards aggregate 550 tons with 575 tons, mostly mesh, pending and bid for Connecticut highways. Price shading still crops out on more attractive transactions.

Philadelphia — Other than the 2450-ton Washington printing plant job, previously noted, reinforcing bar business is practically non-existent except for a number of small projects taking less than 100 tons individually. Prices are weak on formed material.

Cleveland—Requirements for reinforcing bars failed to make improvement through May. Current needs are limited to small miscellaneous tonnages ranging up to 50 tons. Considerable tonnage for the Main street bridge, Cleveland, is still pending although the general contracts were awarded some time ago. Prices continue unsettled.

Pittsburgh — Activity in reinforcing steel is negligible, although some larger projects are expected shortly. Weaknesses are still being reported in various sections, although the reaffirmation of prices

Concrete Bars Compared

	Tons
Week ended May 28	**5,609**
Week ended May 21	**7,204**
Week ended May 14	**7,772**
This week, 1937	**3,394**
Weekly average, year, 1937	**6,266**
Weekly average, 1938	**5,774**
Weekly average, April	**8,512**
Total to date, 1937	**106,906**
Total to date, 1938	**127,035**

Includes awards of 100 tons or more.

has caused strengthening in some parts.

San Francisco — Again this market leads in activity with 1134 tons placed, bringing aggregate for the year to 40,974 tons compared with 35,347 tons in 1937. Included among the larger lots were 317 tons for a junior college at San Mateo, Calif., placed with Bethlehem Steel Co. Bids have just been opened on 730 tons for four projects for the bureau of reclamation for delivery at Odair, Wash., Parco, Wyo., Ignacio, Colo., and Rutledge, Texas.

Seattle — The market is barren of promising prospects. Lack of private and industrial construction is marked, practically all business coming from public projects. Washington state opened bids May 24 for two crossing jobs involving 460 tons. Reclamation bureau will open bids at Boise, Idaho, June 13 for a unit of the Black Canyon project calling for 415 tons reinforcing and 50 tons miscellaneous steel items.

Reinforcing Steel Awards

975 tons, superstructure, Thirteenth street bridge, Savannah river, Richmond county, Georgia, to Bethlehem Steel Co., Bethlehem, Pa.

800 tons, Petroleum Industries building, world's fair, New York, to Bethlehem Steel Co., Bethlehem, Pa.

470 tons, state highway projects, Palo Alto county, Iowa, to Laclede Steel Co., St. Louis.

433 tons, mesh, highway project, W. P. 38-4, Wantagh parkway extension, section 2, Nassau county, New York, to American Steel & Wire Co., New York; Good Roads Engineering & Contracting Co. Inc., Lynnbrook, N. Y., general contractor, at $864,640.80, bids April 19, Albany.

350 tons, sewage pumping stations, Springfield, Mass., to Buffalo Steel Co., Buffalo, through Albany Steel & Iron Supply Co., Albany, N. Y.; Fred T. Ley & Co., Springfield, Mass., general contractor.

317 tons, junior college, San Mateo, Calif., to Bethlehem Steel Co., San Francisco.

300 tons, Mt. Greenwood outfall sewer, Chicago, to Republic Steel Corp., Cleveland, through O. J. Dean, Chicago.

296 tons, mesh, highway project, Northern state parkway, section 3, and Wantagh parkway extension, section 1, Nassau county, New York, to American Steel & Wire Co., New York; Andrew Weston Co Inc., Woodmere, N. Y., contractor, at $647,153.50, bids April 12, Albany.

190 tons, mesh highway project RC-3938, Erie county, New York, to American Steel & Wire Co., New York; Holmes & Murphy, Orchard Park, N. Y., contractor, at $253,222.95, bids April 23, Albany.

170 tons, high school, Iowa City, Iowa, to Bethlehem Steel Co., Bethlehem, Pa.; Paul Steenburg Construction Co., St. Paul, general contractor.

168 tons, Washington state project, Ritzville, to unnamed interest at Portland, Oreg.; Northwest Inc., Portland, general contractor.

127 tons, highway work, Marin county, California, for state, to Gilmore Steel & Supply Co., San Francisco.

126 tons, dam, Hollister, Calif., for Pacheco Pass Water district, to San Jose Steel Co., San Jose, Calif.

124 tons, Glenview school, Oakland, Calif., to W. C. Hauck & Co., San Francisco.

122 tons, invitation 22262-A, bureau of reclamation, Mills, Wyo., to Colorado Fuel & Iron Corp., Denver.

121 tons, post office, Kalamazoo, Mich., to West Virginia Rail Co., Huntington, W. Va.; Algernon Blair, Montgomery, Ala., general contractor.

120 tons, Bronx approach, Whitestone bridge, New York, to Joseph T. Ryerson & Sons Inc., Chicago; through Johnson Drake & Piper Inc., Freeport, N. Y.

100 tons, mesh, highway project 3951, Cuba-Black Creek, Allegany county, New York, to American Steel & Wire Co., New York; Rochester Concrete Construction Co. Inc., Rochester, N. Y., contractor, at $102,521.05, bids May 17, Albany.

100 tons, bars and shapes, addition, Grass Island sewage treatment plant, Greenwich, Conn., to Concrete Steel Co., New York, and New England Iron Works, New Haven, Conn.; F. H. McGraw & Co. Inc., Hartford, Conn., general contractor.

100 tons, Nevada creek storage project, Powell county, Montana, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, Bitterroot storage project, Kor-

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Here, There, 'n' Everywhere

■ There has been much talk these last few years on the nation's total income—how it dropped down to 40 billion then snuck back up to 60-some in 1937. We've been doing some researching in the latest U. S. Census figures and came out with the interesting fact that STEEL's metal producing and metalworking industry accounted for over $11,000,000,000 sales volume in 1935 which takes a big chunk out of the country's total. This was far and away greater than any other single industry. Other eye-bulgers: STEEL's industry in the same year purchased over 7 billion dollars worth of materials, containers, fuel and electrical energy. The industry employs one-third of all labor, and accounts for 30 per cent of the nation's industrial activity.

■ How would you like to have been a Celt back when they were invading Italy in 223 B. C.? They, meaning Messrs. Graham and Work of J. & L., tell us that a Celt in those days had to be a sure shot with those long iron swords they used or they might spend the rest of their lives dead. It seems the swords were easily bent and would stand only one socko. After that the edges got so turned and the blades so bent that the Celtic warrior would have to take time out to straighten his sword or toss it away and start biting. The Romans whipped the pants off the Celts at Addua because of the lousy iron swords they had. Every time they stopped to straighten they were sunk. The Romans apparently were playing the old rules.

■ A pretty reliable sign that business is either very good or very poor is the number of male foursomes you can find out on the golf courses these week-day afternoons. Of course, we just hear about it, our great aunt having died too many times to be buried again for a long while.

■ Recovery note in the *Daily Metal Trade:* A parking lot in Detroit is being razed to make way for a building.

■ Another more resounding recovery note was voiced by "your Noo Yawk correspondent", Walter Winchell last Sunday over the radio. Walter said he had been talking to an influential group of Wall St. specie Republicans, who told him he could break the news that Recovery was just around the August 1 corner. The bigwigs said the boom would start with steel, heavy equipment, motors and textiles. Well, Walt gets on our nerves once in a while but if he hits this one on the nose we'll start signing all our mail "with lotion's of love"—and smear Jergen's cream all over the place.

■ The American Iron & Steel institute this year restricted its annual get-to-gether to members only. Much disappointed were many perhaps, but very much present were members E. L. Shaner, editor-in-chief, E. C. Kreutzberg, editor, and G. O. Hays, business manager. For all the dope, see pages 13-17.

■ Incidentally, said institute reports that raw materials fed into the nation's blast furnaces last year would make a pile one city block square and 1 1/3 miles high. All the two million-odd freight cars in the country would be loaded to capacity if the materials had to be transported at one time. That was in 1937, before we got behind the 1938-ball.

■ Office boy's comment on the morning after a bad night: "I would sure like to go fishin' today—and *not* catch anything!"

■ Two guesses on what railroad hauls the heaviest tonnage per mile. Right guessers will receive elaborate mention but no fair peeking before guessing.

—SHRDLU

alli county, Montana, to Colorado Fuel & Iron Corp., Denver.

Reinforcing Steel Pending

1500 tons, Illinois road work; new bids to be asked.
600 tons, completion of Soldier Field stadium, Chicago; Lundoff-Bicknell Co., Chicago, awarded general contact.
460 tons, two Washington state highway projects; bids opened at Olympia, May 24.
415 tons, unit of Black Canyon project, Idaho; bids to reclamation bureau, Boise, June 13.
413 tons, specification 790, bureau of reclamation, Fayette division, Boise project, Idaho; bids June 13.
308 tons, mesh, highway project ESP 38-4, Eastern State parkway, sections 4 and 5, Dutchess county, New York; John Arborie Inc., Poughkeepsie, N. Y., contractor, at $261,265, bids May 17, Albany.
200 tons, bureau of reclamation, invitation A-22,348-A, Parco, Wyo.; bids opened.
180 tons, mesh, highway project RC-3953, Monroe county, and RC-3955, St. Lawrence county, New York; C. P. Ward Inc., Rochester, N. Y., $96,997.57, and the Belmar Contracting Co., Troy, N. Y., $79,964.10, contractors, respectively, bids May 17, Albany.
175 tons, school building, Pocatello, Idaho.
171 tons, bureau of reclamation, invitation 32,044-A, Ignacio, Colo.; bids opened.
168 tons, bureau of reclamation, invitation A-46,579-A, Rutledge, Texas; bids opened.
165 tons, mesh and bars, paving Bronx approach, Whitestone bridge, New York; Bronx Water Works Co. low.
160 tons, mostly mesh, highway, 8710 feet reinforced concrete, South Main street, Waterbury, Conn.; Arute Bros. Inc., New Britain, Conn., general contractors, bids May 23, Hartford.
140 tons, nurses' home. Sisters of Mercy, Pontiac, Mich.
121 tons, mesh, highway project RC-3952, Norwich-Plymouth, Chenango county, New York; Stento Paving Co., Binghamton, N. Y., contractor, at $130,961.90, bids May 17, Albany.
100 tons, building, Y. M. C. A., Springfield, O.

Pig Iron

Pig Iron Prices, Page 68

Announcement has been made by practically all producers of pig iron that second quarter prices on all grades will be continued for third quarter. Those who have not yet made official statement are expected to follow soon. Books have been opened for that delivery but no added buying has been apparent.

While England now is definitely out of the market as a result of her new import duty, some inquiry continues to be noted from other European countries.

New York — With reaffirmation of prices for third quarter there has recently been a slight improvement in volume. Outlook for melters here continues depressed and consequent-

ly such slight improvement as has been noted is expected to be largely temporary.

Boston — Foundry melt continues at a low rate, although small lot buying has improved slightly and total sales during May were a shade better than for other months this year. Despite low consumption, stocks have been worked down and at even current rates some supplies are needed. This is increasingly reflected in small spot purchases for prompt delivery. Reaffirming of prices has had but slight effect on volume. Few foundries are operating near normal, although there are exceptions. The textile, electrical equipment, shoe machinery and stove foundries, however, are sharply curtailed.

Philadelphia — Pig iron consumers are awaiting further clarification of the price structure before placing other than day-to-day requirements. Current business is confined to minimum cars. Operations show little change. Alan Wood Steel Co., Conshohocken, Pa., blew out its second furnace May 24.

Buffalo—Reaffirming of pig iron prices has had no effect on buying. Inquiries from miscellaneous sources are limited to small volume for immediate shipment. Melting is declining as foundries are operating an average of two days a week.

Cleveland — Foundry operations remain on a one or two day weekly schedule in most instances. Current demand consists of small orders for prompt delivery. Sellers report May shipments exceeded April by a slight margin, but many feel that June will show a moderate recession from the May level. Announcement of third quarter prices unchanged has not materially stimulated new business.

Cincinnati—Buying of pig iron is for current needs for prompt shipment. Melters' inventories are depleted. Tonnage moved in May was slightly less than in preceding months as a reflection of slow demand for castings. There is no inquiry for third quarter.

Pittsburgh—Although no official action has been taken here on reaffirmation of pig iron prices, buyers are being told by pig iron suppliers there will be no change. Orders are spotty, with occasional carloads moving, and foundry activity is dull. Stocks generally are low, although somewhat of a backlog has been built up by producers. Two blast furnaces have been taken off in the district in the past ten days.

Chicago—Reaffirmation of prices on all grades of pig iron for third quarter has resulted in no increase in business. Buying remains slow. Foundries are low on stocks but wait till last minute and then order only small lots. Marked upturn in demand for pig iron is looked for at end of summer. Only minor lots of charcoal iron are being sold.

St. Louis—Distributors and producers of pig iron report a fair volume of scattered small-lot sales, mainly to lesser melters, but a complete dearth of interest in distant requirements. With prices unchanged for third quarter and uncertainty regarding business during second half, there is no incentive to accumulate. Shipments and the melt have sustained a further moderate decline, and all indications point to smaller totals for this month as contrasted with April, and heavy contractions from May, 1937.

Birmingham, Ala.—With only six furnaces in blast Southern pig iron melt has struck the low point of the year, with nothing immediately ahead which would indicate a gain. Major producers have fairly heavy stocks with few shipping instructions.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 67

Third quarter prices have been announced without change from second quarter on all bolts and nuts.

Demand shows no improvement over the dullness of recent weeks. Needs of farm equipment manufacturers, while forming a fair percentage of business, are decreasing weekly. General rumors of an early upturn in local construction work are not counted on heavily, many bolt and nut producers still awaiting railroad buying as the first signs of increased activity.

Scrap

Scrap Prices, Page 70

New York — Prices continue to sag despite lack of buying by all classes of consumers, brokers quoting about 50 cents per ton lower on borings and turnings, No. 1 machinery cast, grate bars, specification pipe and heavy melting steel. For the latter, dock delivery, export, most brokers have reduced prices, paying $8.50 for No. 1 and $7 for No. 2 although one shipper is paying 50 cents to $1 more and taking what is offered, although material comes out slowly. Most brokers are not anxious to take in much

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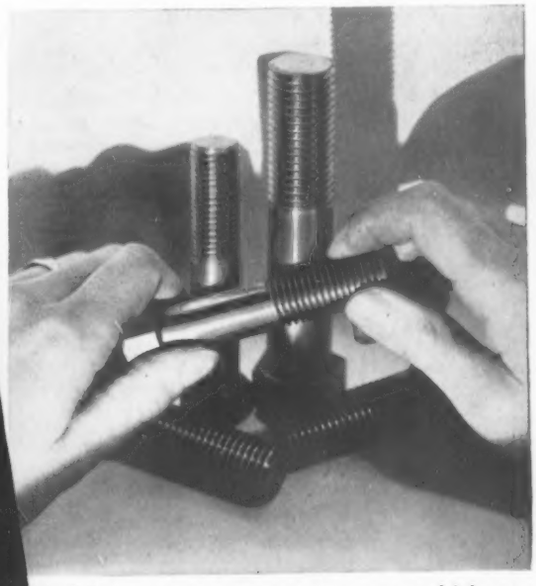

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SET SCREWS • BOLTS AND NUTS

scrap for export under current slack conditions.

At the close of meetings of brokers with representatives of the European scrap cartel Friday no business had been definitely closed with American sellers. With need of material not so acute European buyers are pressing hard for prices considerably under what they have paid to date and if any business is done it is likely to be about in line with present weak quotations for barge and dock delivery, Atlantic seaboard.

Boston — Iron and steel scrap prices still tend downward, although largely nominal with buying by district foundries small and scattered. Steel works are taking practically no material. Revision of prices for Pennsylvania shipment makes appraisals of most grades lower. Cast grades for delivery in New England are easy. While some yard dealers are resisting the trend, enough scrap is appearing to meet lower offers by consumers and some of this appears to be distress material. Export orders are practically filled and buying for dock delivery is near a standstill.

Philadelphia — Scrap has not softened further to any appreciable extent. Brokers are finding No. 1 steel none too freely available at $11.50 for shipment against orders.

Buffalo—Although at first reluctant to sell at the lower bids, dealers in iron and steel scrap have broken the short deadlock by contracting to sell approximately 3500 tons to the leading mill.

Cleveland — So little actual iron and steel scrap business is going that price changes are being changed on single carloads.

Some readjustment downward has taken place in Cleveland and Youngstown district quotations, amounting to about 50 cents.

Cincinnati — Quotations on iron and steel scrap are down 25 cents on the basis of minor miscellaneous sales and general weakness. Many dealers, however, are unwilling to release stocks on this basis, awaiting renewal of consumer demand. Little material is coming out and absorption without mill buying is not difficult.

Pittsburgh—The scrap market is dull. Prices are holding at current levels, although recent sales have shown prices as low as $11. Dealers' buying prices have not come down and scrap moving consists of a few scattered distress lots, with bona fide orders practically stopped. Temporary bottom has apparently been reached in the downward price trend inasmuch as the dealers' selling price in a great many cases is less than the usual 50-cent spread above the buying price. Unless scrap becomes available to dealers at lower prices, it is doubtful if any reduction in the selling price will be general.

Detroit—A number of automotive lists came out late last week, but tonnages in general were lighter than expected. Automotive production is tapering and scrap tonnages probably will dwindle until possibly August. Ford scrap piles are heavy, one estimate placing the tonnage laid down at the Rouge in the vicinity of 75,000 tons. Most of this material has been on hand for a long while.

Chicago — Scrap prices continue weak, with reductions of 50 cents a ton on a number of grades. Heavy melting steel is nominal since the last mill purchase at $11 but the trade is looking for lower levels. Dealers and brokers are picking up limited tonnages at $10.25, with some scrap reported available at $10.

St. Louis—Aside from the sale of 10,000 tons of No. 2 heavy melting steel to an east side mill the market for iron and steel scrap was without features of interest or importance. The price paid for the steel was reported to be $10.50 per ton, which was considerably below that paid for the last preceding purchase of the identical grade by this mill. The business was divided between several dealers, and delivery is specified to cover 60 to 90 days. It is stated that firms participating in the sale are prepared to make prompt delivery on a large part of the tonnage.

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GRANITE BUILDING, PITTSBURGH, PA.

Warehouse

Warehouse Prices, Page 69

Cleveland—Shipments from warehouse stock showed slight improvement recently. The number of orders was substantially unchanged, but individual tonnages made slight gains. Some distributors feel this moderate improvement is only temporary, due primarily to re-affirmation of mill prices for third quarter on most products. It is expected that warehouse distributors will probably announce third quarter price schedules soon.

New York—Revisions in warehouse steel prices next quarter are expected to be few. Minor changes in some finishes of sheets and strip are likely. Volume with jobbers is steady, but not large and May tonnage barely equals that of April, some sellers being 5 to 10 per cent under. Bulk of demand is for the standard lines with specialties inclined to lag.

Boston—Warehouse sales in May were slightly under April with most jobbers, although there are some exceptions. Most of the latter are those operating on a price shading basis involving seconds in sheets.

Philadelphia — Warehouses are studying revised mill setup on sheets with the view of bringing prices in line. Jobbers will benefit from the mill changes, it is said, since most present stocks are in sizes 24 to 48-inch, which take a mill price advance. Current sales are unimproved.

Cincinnati—Jobber volume during

May showed a slight loss from April. Absence of inquiry for building materials, and the general market lethargy clouds the outlook for the next two or three months. Prices are steady, with no reflection of mill changes for third quarter.

Pittsburgh—Distributors note little change in general run of miscellaneous orders. Price quotations generally have been steady. Warehouse sales are for small lots almost exclusively, with tonnage shipments being light and aggregate volume somewhat under last month. Total will be less than April.

Chicago — Business has decreased slightly, but not as much as anticipated for this season. Maintenance of the present small volume of sales is not believed affected by pending announcement of warehouse prices for next quarter. Price changes are anticipated only in flat-rolled sheets, other figures expected to stay in line with schedules reaffirmed by the mills. New price cards, however, are not looked for immediately.

St. Louis—Warehouse interests report business extremely slow. Outlook for crops was rarely better at this season, but prices are low for farm products, and agriculturists are disposed to conserve cash. Building materials, except small orders for cheap homes, are virtually at a standstill.

Tin Plate

Tin Plate Prices, Page 66

New York—Indications that there will be no early revision in prices are contributing to a better volume of tin plate buying, along with seasonal influences. While there has been some hesitancy since third quarter prices were reaffirmed on rolled steel products generally, due to a revision in black plate, one of the exceptions, this has become largely dispelled as the trade obtains a better understanding of the significance in the change on black plate.

United States Steel Corp. has received an order from the Oriental Steel Plate Co., Japan, an affiliate of Oriental Can Mfg. Co., for tin plate, tin bars and coils for 1938. Total of the order is not stated but it is estimated it may reach 30,000 gross tons, of which about 5000 gross tons may be tin plate.

Pittsburgh — Abnormally high stocks in the hands of can consumers have resulted in lower specifications from canmakers, although the production rate has not been affected. This condition is temporary until the summer pack gets under way and it is expected the current rate will hold for some time yet at around 55 per cent.

Iron Ore

Iron Ore Prices, Page 70

Cleveland — With the closing of several substantial sales last week, Lake Superior iron ore prices for the 1938 season were re-established at last year's levels, as follows:

Old range bessemer, $5.25; old range nonbessemer and Mesabi bessemer, $5.10; Mesabi nonbessemer, $4.95, and a high phosphorous ore, $4.85, delivered lower lake ports with guarantee of 51.50 per cent natural iron.

It is understood the ore shippers will absorb increases in freight and handling charges established in the latter part of last year and early part of this year. These increases were put in effect in Wisconsin, Michigan and Minnesota. They vary from 2c to 8c a ton, depending upon the origin of the ore. However, the Lake Superior & Ishpeming and the Duluth, South Shore & Atlantic railroads have canceled the increase of 6 cents a gross ton on iron ore transportation which became effective Nov. 15 last year on these roads.

Steel in Europe

Foreign Steel Prices, Page 69

London — (*By Radio*) — Foundry pig iron producers' association of Great Britain has announced prices unchanged for second half year. Consumers are disappointed, as the pig iron trade continues its decline. Producers still hope the government may decide to build pig iron stocks. However, the defense minister, in response to a question, recently stated the government has considered the matter fully and had decided not to undertake such a reserve at present, but would keep the question under review.

Export trade is low. The steel trade continues slack in lighter products, sheet mills producing well below capacity. Merchant steel stocks at warehouses are increasing.

The Continent reports export trade quiet, probably due to the impending cartel renewal.

Ferroalloys

Ferroalloy Prices, Page 68

New York—Ferromanganese shipments have shown little variation recently, with some sellers predicting that the movement for May will be about on a par with April, which in turn was down somewhat from March, the most active month this year. In view of limited steelmaking operations, shipments have been

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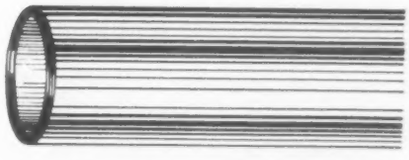

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ORDER FROM STOCK

restricted to small volume compared with a year ago. Some trade leaders look for a slight tapering next month, with shipments sluggish throughout most of the summer.

Sellers are expected to open books for third quarter around the middle of June and, from present indications, there will be no change in price, which is now $102.50, with duty paid, Atlantic and Gulf ports.

Domestic spiegeleisen, 19 to 21 per cent, is expected to remain unchanged at $33, Palmerton, Pa., and 26 to 28 per cent material at $39. Volume continues light, in line with the present depressed rate of steel production. Other ferroalloys also are moving slowly.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

May	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
21	9.00	9.12½	8.52½	36.00	36.15	4.50	4.35	4.00	20.00	12.25	35.00
23	9.00	9.12½	8.52½	36.50	36.65	4.25	4.10	4.00	20.00	12.25	35.00
24	9.00	9.12½	8.52½	37.20	37.30	4.25	4.10	4.00	20.00	12.00	35.00
25	9.00	9.12½	8.52½	36.75	36.85	4.25	4.10	4.00	20.00	12.00	35.00
26	9.00	9.12½	8.52½	36.12½	36.20	4.25	4.10	4.00	20.00	12.00	35.00
27	9.00	9.12½	8.52½	35.80	35.90	4.00	3.85	4.00	20.00	12.00	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper

Sheets

Yellow brass (high) 15.62½
Copper, hot rolled 17.12½
*Lead, cut to jobbers 7.50
Zinc, 100-lb. base 9.75

Tubes

High, yellow brass 18.37½
Seamless copper 17.62½

Rods

High yellow brass 11.62½
Copper, hot rolled 13.62½

Anodes

*Copper, untrimmetd 14.37½

Wire

Yellow brass (high) 15.87½

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

*New York 4.35-4.60
*Cleveland 4.75-5.00
*Chicago 4.50-4.75
*St. Louis 4.87½-5.12½

Heavy Copper and Wire

*New York, No. 1 ..... 6.00-6.25
*Cleveland, No. 1 ..... 5.75-6.00
*Chicago, No. 1 ..... 6.00-6.25
*St. Louis 6.00-6.25

Composition Brass Borings

*New York 3.60-3.85

Light Copper

*New York 4.35-4.47½
*Cleveland 4.25-4.50
*Chicago 4.25-4.50
*St. Louis 4.25-4.50

Light Brass

*Cleveland 2.50-2.75
*Chicago 2.62½-2.87½
*St. Louis 2.50-2.75

Lead

*New York 3.25-3.50
*Cleveland 2.75-3.00
*Chicago 2.75-3.00
St. Louis 2.75-3.00

Zinc

New York 1.75-1.87½
*Cleveland 1.50-1.75
St. Louis 1.75-2.00

Aluminum

*Borings, Cleveland 3.75-4.00
*Mixed, cast, Cleveland 5.75-6.00
Clips, soft, Cleveland 11.25-11.50
*Mixed cast, St. Louis 6.00-6.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads ... 9.25
Standard No. 12, aluminum 14.25-14.75

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Nonferrous Metals

Nonferrous Metal Prices, Page 68

New York — Undertone of major nonferrous metals weakened last week on continued lack of sustained buying and further easiness in the foreign markets. Lead declined $10 per ton, export copper dropped to a low of 8.15c, while tin slipped lower to around 35.80c. Zinc was unchanged despite dull demand.

Copper — Although foreign copper statistics released late Friday revealed that consumption abroad advanced above the March record level and was about 9000 tons larger than the best figure for 1937, export copper continued to ease closing at 8.15c, c.i.f. European ports. Total foreign blister and refined stocks declined 13,990 tons making the world total decline about 6254 tons. Sales in the domestic market remained small with prices unchanged at 9.00c, Connecticut, for electrolytic.

Lead — Leading sellers lowered prices ¼-cent on Monday and a like amount on Friday, bringing the market to the lowest level in nearly three years at 4.00c, New York, and 3.85c, East St. Louis. Weakness was attributed to continued lack of sustained buying support and steadily increasing stocks.

Zinc — Prime western zinc held unchanged at 4.00c, East St. Louis. The undertone appeared firm since production is being curtailed and present levels are unprofitable for many producers, indicating further curtailment unless prices recover.

Tin — Activity was dull throughout the week since consumers showed no substantial buying interest while sellers limited offerings pending release of the official report on the Malayan referendum on the buffer pool proposal. Straits spot closed down to 35.80c.

Shipyards Sale Approved

■ United Shipyards Inc. stockholders have approved sale of the company's properties to Bethlehem Shipbuilding Corp. for $9,320,000. With this transaction Bethlehem now has shipyard facilities at Boston, New York, and Baltimore, in addition to facilities on the Pacific coast.

Cold-Finished

Cold Finished Prices, Page 67

Pittsburgh—Cold finished steel orders here have dropped sharply the past few days and the market is extremely quiet. Builders of textile machinery have released some orders but activity in other lines is down. Farm machinery manufacturers are less active than previously and it is believed orders are being filled from inventories.

Semifinished

Semifinished Prices, Page 67

The semifinished steel market has dropped off with last week exceedingly dull. Nonintegrated mills are reflecting the current lack of business and are not ordering semifinished steel other than for orders already received. It is quite likely the current rate will hold for some time in view of the present business outlook.

Coke By-Products

Coke By-Product Prices, Page 67

New York — Toluol has been marked down to 22.00c per gallon, producers' plants, a reduction of 8.00c. Nitration toluol is quoted 26.00c, freight allowed, with the drum differential unchanged at 5.00c, f.o.b. producers' ovens. Only benzol of the leading distillates is unchanged, industrial xylol and solvent naphtha being 4.00c per gallon lower, or 26.00c, producers' plants. Demand is light, notably with lacquer-makers, although curtailed production prevents heavy accumulations. Phenol buying is slack, the plastic trade taking light shipments. Chemical demand for naphthalene is light, but for household use the season, now waning, is about normal in volume. Shipments of sulphate of ammonia to the fertilizer trade have been heavy, but are now slowing down.

Canada's Steel, Iron Output Off in April

■ Production of steel ingots and castings in Canada in April totaled 116,445 gross tons, compared with 118,676 tons in March and 121,426 tons in April, 1937. For four months this year ingot production was 446,481 tons and in the corresponding period last year 473,590 tons.

Pig iron output in April was 65,644 tons, compared with 66,228 tons in March and 68,138 tons in April last year. Four months production of pig iron was 268,181 tons compared with 267,519 tons in the same period last year. Ferroalloy production in April was 8686 tons, in March 4031 tons and in April, 1937, it was 5965 tons.

Equipment

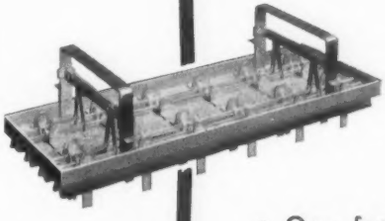
New York—Machine tool orders are light, one or two tools at a time from inquiries previously figured. Most shops, excepting those with foreign orders, have worked off backlogs and are able to ship some units from stock. Railroads are buying practically nothing and low operations by most metalworking industries operates against equipment purchases. Airplane building shops are active, but are not buying many machines. Outlook for crane builders is enhanced by the shipbuilding outlook. Several eastern navy yards will require overhead cranes for enlarged building facilities.

Boston—Machine tool orders are scattered, rarely for more than one or two units at a time. When possible, builders are shipping such orders from stock and in some instances current operations are out of line with shipments, but not much as the bulk of purchases are for specialty units not stocked by most shops. Except for a continuance of current routine business for some time, builders look to several factors for a possible increase; namely some retooling by the automotive industry, machinery required in the government armament program and continued foreign business.

Cleveland — Machine tool and equipment business continues dull and spotty with little hope for a substantial pickup before September. Some miscellaneous orders are being placed by various industries but are for one or two items and total volume is not large. Builders are comforted by sizable backlogs of export business, extending into autumn in some cases. Favorable factors include probable buying for government armament project, continuation of foreign business and anticipated releases by automotive partsmakers.

Chicago—While machinery and equipment sales and inquiries continue slow, occasional spurts have appeared lately. These have been confined to a few major equipment orders which have bolstered May business for certain interests to the best level so far this year but hardly are indicative of a definite change in general trend which is sidewise or slightly downward. Machine tool sellers look for continuation of quiet business during the summer in view of the slow rate of inquiries. Some railroad shops are reopening but this is not counted on to stimulate machinery buying by the carriers. Small tool buying still is spotty and moderately below the rate of earlier months.

Seattle—Dealers report fair inquiry but demand from industrial sources is less than a year ago. Electrical and pumping equipment, also mining items continue active but cannery and lumbering interests are not purchasing in normal seasonal volume. U. S. engineer, Portland, Oreg., has called bids June 3 for constructing five pumping plants near Clatskanie, Oreg.



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Construction and Enterprise

New York

BUFFALO—Phoenix Brewery Corp., 300 Emslie street, soon takes bids on general contract, for erection of 65 x 105-foot bottling plant addition, costing about $40,000.

BUFFALO—National Gypsum Co., 190 Delaware avenue, is planning to erect a new mill in the South, including power house, machine shop and auxiliary departments. Cost about $900,000 with machinery. Company has arranged bond issue of $3,500,000 for financing project.

CELERON, N. Y.—Village board trustees plan purchasing electrically operated pumping machinery, sludge pits and other equipment for municipal sewage disposal plant. Cost to exceed $20,000.

ELMIRA, N. Y.—Delaware, Lackawanna & Western Railroad Co., G. A. Phillips, chief engineer, Hoboken, N. J., plans new heating plant at passenger station, including installation of two boilers. Cost estimated at $25,000; also plans constructing and equipping an electrically-operated coaling station at locomotive terminal, cost of which will exceed $25,000 with equipment.

NIAGARA FALLS, N. Y.—Electric City Paper Mills, manufacturer of roofing felt, plans to repair its plant here. Estimated cost including equipment $40,000.

OSSINING, N. Y.—Cambridge Instrument Co. plans plant addition, costing approximately $100,000.

PLATTSBURG, N. Y.—City will soon take bids, contract 4, for erection of pumping station and installing equipment in connection with construction of sewage system and disposal plant. Cost $340,000. PWA project. G. D. Holmes, Starrett-Syracuse building, Syracuse, engineer.

RENSSELAER, N. Y.—General Aniline Works Inc., 435 Hudson street, New York, soon takes bids for heating, electrical work and sprinkler system for warehouse addition.

Connecticut

GREENWICH, CONN.—Davenport Processing Co. contemplates construction of a plant to replace the one recently damaged by fire. Estimated cost $40,000.

MERIDEN, CONN.—Hampden Bottling Works is constructing a two-story 40 x 130-foot bottling plant. Estimated cost $40,000.

NEW BRITAIN, CONN.—Mayor George J. Coyle has consulted with PWA administration heads at Washington to determine what assistance he can obtain to establish a municipal power plant.

Maine

HALLOWELL, ME.—Colonial Beacon Oil Co. Inc., W. R. Phael, district engineer, 378 Stuart street, Boston, soon lets contract for constructing bulk storage plant, including steel tanks, loading racks. Cost to exceed $40,000.

Rhode Island

PROVIDENCE, R. I. — Pittsburgh Plate Glass Co. is erecting a one-story 150 x 170-foot, brick, steel, plank roof warehouse, including boiler room. Cost $52,000.

Massachusetts

BRAINTREE, MASS.—Pneumatic Drop Hammer Co. is erecting a building, 50 x 140 feet, estimated to cost $40,000.

CAMBRIDGE, MASS.—William Crane Inc. is building four one-story steel factory buildings. Cost to exceed $40,000.

CHELSEA, MASS.—Union Metal Works is constructing a one-story, 67 x 100-foot addition. Estimated cost $40,000.

New Hampshire

GONIC, N. H.—Gonic Mfg. Co. plans to install a new turbine to provide its own power and will make boiler room improvements and add a 50,000-gallon tank.

MANCHESTER, N. H.—Harrison Abrasive Corp., recently formed by Nathan C. Harrison and associates, has acquired part of former local textile mill of Amoskeag Mfg. Co., and will remodel property for production of chilled steel shot, diamond steel grit and kindred abrasive products.

Pennsylvania

ALTOONA, PA.—City is preparing plans and estimates for general expansion of municipal water supply and distribution system. H. J. Baum, city engineer. Cost estimated at $500,000.

JOSEPHTOWN, PA.—St. Joseph Lead Co., 250 Park avenue, New York, is considering extensions and improvements to its plant here, including installation of mechanical handling equipment, power plant, conveyor system and other facilities. Estimated cost $150,000 with equipment. W. B. McBride is company engineer.

NEW CASTLE, PA.—Johnson Bronze Co., Mill street, maker of bronze bushings, bearings, castings, contemplates erection of one-story addition, 75 x 145 feet. Cost about $50,000 with machinery.

Ohio

SANDUSKY, O.—City commission has decided to place a proposal for erection of a $1,515,000 municipal power plant before voters at the August primary election.

TOLEDO, O.—Hewlett & Best, architects, Richardson building, soon lets contract for bottling plant for Great Lakes Coca Cola Bottling Co., 1235 Summit street. Cost $100,000.

TROY, O.—Hobart Cabinet Co., manufacturer of steel furniture, plans construction of addition to its plant on Water street, costing about $40,000 with equipment. Pretzinger & Pretzinger, Reibold building, Dayton, O., architects.

Michigan

ANN ARBOR, MICH.—City plans erection of two buildings to house equipment, pumps, treatment machinery, elevated tank, complete sewage system. Cost $200,000. May apply for federal aid. Ayers, Lewis, Norris & May, engineers, Ann Arbor, Mich.

DETROIT—Atlas Crank & Mfg. Co., 4408 Bellevue avenue, maker of automobile carburetor and accelerator rods, has purchased the former plant of Ottawa Mfg. Co., Spring Lake, Mich., and will remodel for new works, removing present plant to new location and increasing capacity.

GRAND RAPIDS, MICH.—Standard Oil Co. is considering addition to its bulk storage and distributing plant at Battle Creek, Mich. Cost $40,000 including equipment.

MOUNT CLEMENS, MICH.—Supreme Propeller Corp., recently formed with $150,000 capital to manufacture a new type hollow-steel propeller for airplanes, has taken over a local building for plant and will begin production soon. N. J. Stone is general manager.

PONTIAC, MICH.—Yellow Truck & Coach Mfg. Co. plans erection of one-story addition to machine shop. Cost about $50,000 with equipment.

Illinois

CHICAGO—Jordan Co., 2630 West Arthington street, maker of industrial chemicals, is taking bids on general contract for new plant, comprising 12 one-story buildings, with power house, machine shop and other mechanical units. Cost about $350,000 with equipment.

COBDEN, ILL.—City, care of B. Brodway, mayor, plans sanitary sewage system, costing $75,000. Application made for WPA funds. Russell & Axon, 4903 Delmar boulevard, St. Louis, engineer.

GRIGGSVILLE, ILL.—City, J. Logsdon, mayor, voted bonds for constructing sewage plant, complete with auxiliary piping, accessories and appurtenances. Cost $85,000. Russell & Axon, 4903 Delmar boulevard, St. Louis, engineer. WPA project.

LEMONT, ILL.—Globe Oil & Refining Co. plans extensions and improvements to oil refinery. Cost over $50,000 with machinery.

Indiana

INDIANAPOLIS—F. S. Royster Guano Co., Royster building, Norfolk, Va., maker of commercial fertilizers, contemplates a new branch plant here, comprising a main one-story unit, 240 x 480 feet, and about eight auxiliary buildings, including power house, pumping station, machine shop and storage building. Cost $500,000 with equipment. E. C. Doeppers, Law building, Indianapolis, is engineer. A. L. Griffin is company engineer.

Alabama

BIRMINGHAM, ALA.—White Dairy Co., Crestline Heights, is erecting a pasteurizing plant. All machinery and piping will be of stainless steel. Cost $100,000. E. O. Whilldin, Empire building, architect.

FAIRFIELD, ALA.—City, C. N. Gilley, mayor, will apply to PWA for loan and grant to finance purchase and construct electric distribution system; cost $300,000.

MOBILE, ALA. — Hollingsworth & Whitney Co., 140 Federal street, Boston, has acquired a site here and plans to construct a paper mill. Estimated cost $5,000,000.

District of Columbia

WASHINGTON—Treasury department, procurement division, branch of supply, will take bids to 10 a. m., June 2, for one two-drum, gasoline-engine-powered hoist.

WASHINGTON—Bureau of yards and docks, navy department, will take bids soon for extension of main wharf at naval ammunition depot, Iona Island, N. Y., including installation of mechanical handling equipment. Appropriation of $60,000 has been authorized.

WASHINGTON — Bureau of supplies and accounts, navy department, will take bids until 10 a. m., June 3, schedule 3597, corrosion-resisting sheet steel, delivery Norfolk, Va.; until June 7, schedule 3556, wrenches; schedule 3557, aluminum alloy ladder treads; schedule 3565, steel cable; schedule 3567, railroad rails and

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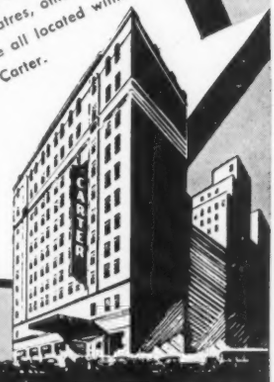

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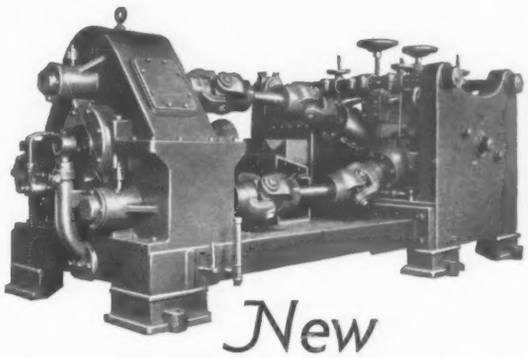

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Kentucky

DANVILLE, KY.—Royal Crown Bottling Co. Inc. has let contract to A. W. Walker for erection of mechanical bottling plant, costing $65,000 with equipment. Frankel & Curtis, architects, McClelland building, Lexington, Ky.

LEXINGTON, KY.—Lexington Water Co., care of American Water Works Co., 50 Broad street, New York, will take bids in June for waterworks improvements, costing $200,000.

LOUISVILLE, KY. — Tube-Turns Inc., East Broadway, maker of seamless drawn fittings, has plans for erection of one-story machine shop. Cost $45,000 with equipment.

LOUISVILLE, KY.—Girdler Corp. plans erecting a plant at Twenty-eighth street and Broadway for the manufacture of tube turnings.

TOMPKINSVILLE, KY.—City is having survey made by Pat Sullivan, engineer, for municipal electric system.

Florida

MIAMI, FLA.—Seven-Up Bottling Co., Abraham J. Tobin, president, is planning to erect a bottling plant at 1665 North Miami avenue.

Mississippi

ABERDEEN, MISS.—Will call for bids soon for electrical distribution system, including transmission line and power substation facilities. Beard Engineering Co., 2606 Oakview terrace, St. Louis, consulting engineer.

WOODVILLE, MISS.—Town, Mary B. Scott, clerk, takes bids June 7 for furnishing one 15-KVA 2300-220-110-volt, 60-cycle high efficiency transformer.

North Carolina

BREVARD, N. C.—Ecusta Paper Corp., 345 West Fortieth street, New York, Henry S. Strouss, president, plans installation of motors and controls, transformers and power substation equipment, regulators, conveyors, electric hoists and other equipment in new pump and paper mill on Davidson river near Brevard. Entire project to cost $2,000,000. Bids are scheduled to be asked soon on general erection contract and equipment. J. E. Sirrine & Co., 215 South Main street, Greenville, S. C., consulting engineer.

South Carolina

ROCK HILL, S. C.—City votes June 14 on $75,000 water improvement bonds.

Tennessee

KNOXVILLE, TENN. — Tennessee valley authority closes June 2 on two 20-ton gantry cranes with lifting beams and track bumpers for the Guntersville and Chickamauga dam power plants.

Louisiana

BOGALUSA, LA.—Louisiana Boganite Corp. plans erecting a steel frame and corrugated metal building to house fabricating equipment which will handle 12 to 15 tons per hour of finished product. Earl Engineering Co., engineer, 636 Whitney Bank building, New Orleans.

Virginia

SOUTH BOSTON, VA.—City council has appointed a committee to investigate the advisability of the erection of a municipal electric plant. Should proposal prove feasible, application will be made for loan through PWA for necessary funds.

Missouri

LA PLATA, MO.—City plans taking bids soon for municipal power plant and electrical distributing lines. Cost close to $100,000. E. T. Archer & Co., New England building, Kansas City, Mo., consulting engineer.

ST. JOSEPH, MO.—Dannon Grain & Milling Co., Eighth and Atchison streets, H. L. Dannon, head, has plans for construction of a new grain elevator at Maryville, Mo., costing over $40,000 with elevating, conveying, screening and other equipment.

ST. LOUIS—Johnson Tin Foil & Metal Co., 6106 South Broadway, plans to erect an addition to its plant, costing $35,000.

ST. LOUIS—Steel Sales Corp., 4067 Park street, is taking bids on general contract for one-story storage and distributing plant. An air conditioning system, overhead traveling cranes, hoists, etc., will be installed. Cost estimated at $85,000 with equipment. H. A. Durr & Co., 123 West Madison street, Chicago, consulting engineers. Company's main offices are at 129 South Jefferson street, Chicago.

Texas

AMARILLO, TEX.—Shamrock Oil & Gas Co. is having preliminary surveys made for construction of a plant to extract various types of oil and gasoline from natural gas. Estimated cost $250,000.

BRAZORIA, TEX.—Del Ray Producing Co., R. R. Dean, vice president, plans to construct a gas plant with a daily capacity of 18,000,000 cubic feet at Sandy Point, near Brazoria. Estimated cost between $80,000 and $100,000.

BROWNFIELD, TEX.—Arizona Chemical Co., Brownfield, plans to construct a two-story chemical plant here. Sodium sulphate will be mined and after processing will be used for refining purposes. Machinery and equipment will be purchased and installed. Estimated cost $70,000.

CAMERON, TEX.—City, C. C. Smith, mayor, voted bonds for water filtration plant and distribution system; cost $150,000. Joe J. Rady, engineer, Majestic building, Fort Worth, Tex.

GILMER, TEX.—Upshur County Rural Electric Co-operative, E. A. Cobb, president, has applied to REA for additional funds to construct 125 miles rural power lines in Upshur county, to cost $125,000. Hawley, Freese & Nichols, engineers, Capps building, Fort Worth, Tex.

GROESBECK, TEX.—City applied to PWA for grant for water works improvements; $80,000 bonds available; project includes 17,400 feet of 8-inch cast iron supply main; 150,000 gallon elevated tank; 600,000 gallon per day filtration plant. Hawley, Freese & Nichols, engineers, Capps building, Fort Worth, Tex.

SAN ANTONIO, TEX.—Plans are maturing for proposed municipal electric light and power plant for which federal grant of $2,770,000 has been arranged. Work scheduled to begin at an early date.

WHARTON, TEX.—Wharton County Electric Co-operative, R. E. Meek, president, applied to REA for $100,000 to construct 100 miles of rural power lines in Wharton county; Hawley, Freese & Nichols, engineers, Capps building, Fort Worth, Tex.

WHITESBORO, TEX.—West Grayson Electric Co-operative, L. M. Combs, project superintendent, applied to REA for $100,000 to construct 100 miles of rural power lines in Grayson county; Hawley, Freese & Nichols, Capps building, Fort Worth, Tex., engineers.

Nebraska

YORK, NEBR.—City council has voted to proceed with plans for construction of a generating plant and distribution system. Voters authorized city to acquire plant either by purchase or construction at a special election in March.

Iowa

CEDAR RAPIDS, IOWA—Central States Electric Co. plans primary and secondary lines in parts of Palo Alto county for extensions in rural electric system, with power substation and service facilities.

CEDAR RAPIDS, IOWA—Iowa Electric Light & Power Co. plans primary and secondary lines in parts of Story county for rural electrification, totaling about 210 miles of power substation and service facilities. Permission has been secured and work is scheduled to begin soon.

Idaho

BOISE, IDAHO—Bureau of reclamation, Denver, is scheduled to receive appropriation of $750,000 for beginning work on Twin Springs irrigation and power project on Boise river, for which a total fund of $10,000,000 is being secured by the department of interior, Washington. Project will include power dam, with hydroelectric generating station and transmission lines.

BURLEY, IDAHO—Milner Lowlift Irrigation project, Burley, Edgar Moorman, president, has plans under way for a hydroelectric power plant at the Minidoka dam. Fund of $400,000 is being arranged.

Pacific Coast

LOS ANGELES—E-Z Hardware Mfg. Co. has been organized with capital stock of $25,000. Directors are E. J. Baume, Garret H. Allen and Lynn O. Hossom, all of Long Beach, Calif. The new corporation is represented by Mr. Hossom, attorney, Security building, Long Beach.

BREMERTON, WASH.—City is considering proposed water system improvement and extension. Total cost $100,000.

QUINCY, WASH.—City plans $30,000 water system project, involving new tank and tower; also considering construction of disposal plant.

YAKIMA, WASH.—Pacific Power & Light Co. plans construction of a $60,000 subdistrict power station, outdoor type, steel structure. L. R. Sheeley, district manager. Arthur E. Bond, Yakima, engineer.

Canada

HERON BAY, ONT.—Ontario Paper Co., Thorold, Ont., owned by the Chicago Tribune, 435 North Michigan avenue, Chicago, plans erection of a pulp handling plant, power house, etc., here. Estimated cost $200,000.